

PROJECT MANUAL
SPECIFICATIONS AND OTHER DOCUMENTS FOR
Carroll Avenue Pump Station Generator

CITY OF LYNCHBURG PROJECT NO. 04036-W



February 2005

FINANCIAL SERVICES
PROCUREMENT DIVISION
THIRD FLOOR CITY HALL
LYNCHBURG, VIRGINIA 24504
TELEPHONE (434) 455-3970
FAX (434) 845-0711

ADVERTISEMENT FOR BIDS

Sealed bids for the Carroll Avenue Pump Station Generator will be received by the City of Lynchburg, Procurement Division, Third Floor, City Hall, Lynchburg, Virginia until 3:00 p.m., Wednesday, March 23, 2005 and then publicly opened and read aloud in the Bidder's Room, Third Floor, City Hall.

Drawings and project manual may be viewed and printed directly from the City's Procurement website: www.lynchburgva.gov/home/index.asp?page=981.

An optional pre-bid conference will be held at 10:00 a.m., March 3, 2005 in the 2nd Floor Training Room, City Hall, 900 Church St., Lynchburg, VA. The purpose of this conference is for Bidders to familiarize themselves with the site and the existing conditions and to ask questions pertaining to the contract documents. A site visit will be available immediately following the pre-bid.

All requests for clarification of or questions regarding this Bid or for additional information must be made in writing, by facsimile (434) 845-0711 or email to stephanie.suter@lynchburgva.gov and received by 2:00 p.m., March 10, 2005.

BID FORM

Stephanie Suter
City of Lynchburg
Procurement Division-Buyer
900 Church Street
Lynchburg, VA 24504

Dear Ms. Suter:

The undersigned, having carefully examined all contract documents for the Carroll Avenue Pump Generator and also having examined the site and local conditions affecting the work, hereby proposes to furnish all labor, equipment, materials, and services, and to perform all operations necessary to execute and complete the work in accordance with the plans and specifications prepared by Master Engineers and Designers, P.C., together with Addenda Numbered _____, issued during bidding period and hereby acknowledged, subject to the terms and conditions of the Agreement for the amount of:

TOTAL BASE BID:

_____Dollars
(\$_____).

This contract is to be awarded on the basis of the summation of the several unit price and lump sum items and using the estimated quantities. The above shall be referred to hereinafter as the Base Bid. It is understood and agreed that the Owner, in protecting its best interest, reserves the right to reject any or all bids or waive any defects in favor of the City.

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of bids, and final payment for all Unit Price Bid items will be based on actual quantities, determined as provided in the contract documents. It is understood that the Owner reserves the right to raise, lower, or eliminate any quantity or item.

As authorized representative to bind this Company to a Contract, I affirm that we are properly equipped to execute work of the character and extent of the agreement and so covered by this bid and will enter into agreement for the execution and completion of the work in accordance with the specifications of this bid. We further agree that if awarded the contract, we will commence the work within 14 consecutive calendar days of the mutually agreed date stated in the "Notice to Proceed" and will maintain a work force large enough to execute the work and all obligations within the time specified above. The project shall be completed in its entirety within 150 calendar days following the issue date of the Notice to Proceed.

The unit prices listed herein cover the furnishing of all labor, materials, machinery and equipment, and completing the work in accordance with plans, specifications, and contract provisions herein set forth.

We agree to pay as liquidated damages, the sum of Two Hundred Dollars (\$200.00) for each consecutive calendar day that Final Completion is delayed in accordance with the Contract Agreement.

Enclosed herewith is the following Security, offered as evidence that the undersigned will enter into Agreement for the execution and completion of the work in accordance with the Drawings, Specifications and Project Manual:

Bidder's Bond or Cashiers Check in the amount of: \$_____

Bond Issued by or Name of Bank:_____

The undersigned hereby agrees, if awarded the contract, to execute and deliver to the City within ten (10) days after his receipt of the Notice of Award, a satisfactory contract bond as required in the amount of one hundred (100) percent of the Base Bid.

The undersigned further agrees that in case of failure on his part to execute the said Agreement within the ten (10) consecutive calendar days after written notice being given on the award of the contract, the monies payable by the Securities accompanying this bid shall be paid to the City of Lynchburg, Virginia, as liquidated damages for such failure; otherwise the Securities accompanying this Bid shall be returned to the undersigned.

Attached herewith is a Certified Anti-Collusion Statement. Failure to sign and notarize this statement may result in rejection of the Bid.

Attached herewith are completed Statement of Experience and Statement of Resources forms which include the information requested.

The undersigned further certifies that this bid is not the result of, or affected by, any act of collusion with another person engaged in the same line of business, or any act of fraud punishable under the Virginia Governmental Frauds Act.

This bid is subject to acceptance within a period of 90 days from this date.

Respectfully submitted,

DATE

CONTRACTOR

CURRENT CONTRACTOR'S VIRGINIA REGISTRATION NO.: _____

ADDRESS

BY:_____

TITLE:_____

ESCROW ACCOUNT ELECTION

If determined to be the successful low bidder(s), the above signed elects to use the Escrow Account Procedure.

Write "Yes" or "No" on above line

In the event the successful bidder elects to use the Escrow Account Procedure, the "Escrow Agreement" Form shall be executed and submitted to the City of Lynchburg Engineering Division within fifteen (15) calendar days after notification. If the "Escrow Agreement" Form is not submitted within the fifteen-day period, the contractor shall forfeit his rights to the use of the Escrow Account Procedure.

Company_____

Authorized Signature_____

EQUAL OPPORTUNITY REPORT STATEMENT

The Bidder shall complete the following statement by checking the appropriate blank as follows.

The Bidder has _____ has not _____ participated in a previous contract subject to the nondiscrimination clause prescribed by Executive Order 10925, dated March 6, 1961, or Executive Order 11114 dated June 22, 1963.

In conjunction with the City of Lynchburg's policy to utilize Minority and Disadvantaged Business Enterprises wherever possible, the Bidder has solicited quotations for labor, material and/or services from the following:

NAME OF FIRM	PERSON(S) CONTACTED	DATE
_____	_____	_____
_____	_____	_____
_____	_____	_____

Of those listed above, we intend, at this time, to utilize the following in the completion of the work required by this contract:

"This firm assures that it will give its best efforts to utilize Disadvantaged Business Enterprises whenever possible."

CERTIFIED BY: _____(Signature)
_____(Typed/Printed name & Title)

BIDDER'S NAME: _____

IRS NUMBER: _____

_____This firm shall perform all construction with its own employees and, therefore, is not required to solicit quotations from DBE's.

FAILURE TO DOCUMENT AND REPORT DBE CONTACTS ON THIS FORM MAY BE A BASIS FOR REJECTION OF THE BID AS NONCONFORMING.

CERTIFICATION OF NONDISCRIMINATION AND ANTI-COLLUSION

By submitting their bids, all bidders certify to the City of Lynchburg, VA that they will conform to the provisions of the Federal Civil Rights Act of 1964, as amended, as well as the Virginia Fair Employment Contracting Act of 1975, as amended, where applicable, the Virginian's With Disabilities Act, the Americans With Disabilities Act, Section 2.2-4311 of the Virginia Public Procurement Act, and the Lynchburg Procurement Ordinance:

In every contract over \$10,000, the provisions below apply:

1. During the performance of this contract, the contractor agrees as follows:
 - A. The contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment, except where there is bona fide occupational qualification reasonably necessary to the normal operation of the contractor. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
 - B. The contractor, in all solicitations or advertisements for employees placed by or on behalf of the contractor, will state that such contractor is an equal opportunity employer.
 - C. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.
2. The contractor will include the provisions of the foregoing paragraphs A, B and C in every subcontract or purchase order of over \$10,000, so that the provisions will be binding upon each subcontractor or vendor.

Certified by: _____ (corporate seal)

Date: _____

Note: I hereby certify that this bid is not the result of, or affected by, any act of collusion with another person engaged in the same line of business, or any act of fraud punishable under the Virginia Commonwealth Frauds Act.

_____ (seal)

Acknowledged before me this _____ day of _____, _____

Notary Public

My commission expires: _____

STATEMENT OF EXPERIENCE

Proposer: _____

How Long In Business: _____ *At Current Address:* _____

Principals: _____ *Title:* _____
_____ *Title:* _____
_____ *Title:* _____

Type of Work Normally Performed: _____

Projects of this type previously completed:

1. _____
_____ *Amount \$* _____
2. _____
_____ *Amount \$* _____
3. _____
_____ *Amount \$* _____

Reference (for Projects listed above):

1. _____
_____ *Tel. No.* _____
2. _____
_____ *Tel.No.* _____
3. _____
_____ *Tel. No.* _____

STATEMENT OF AVAILABLE RESOURCES

Equipment: _____

Number of Personnel Currently Employed: _____

Number of Personnel Available for Project: _____

Other Pertinent Information: _____

CORPORATE STATUS FORM

ALL PROSPECTIVE FIRMS MUST RESPOND TO THE FOLLOWING

If a limited liability company, limited liability partnership or a limited partnership indicate below:

- Check one: ☐ Limited liability company
- ☐ Limited liability partnership
- ☐ Limited partnership

Have you registered with the State Corporation Commission, to conduct business in Virginia?

☐ Yes ☐ No

Name and address of organizer: _____

List who is authorized to execute contracts: _____

If conducting business under an assumed business name, fill out the following information:

Name of assumed business: _____

Owner's name and address: _____

Registration date: _____ Expires: _____

If conducting business as a sole proprietorship, fill out the following information:

Individual's name liable for all obligations of business: _____

If you are a sole proprietor using an assumed name, please list below:

Registration date: _____ Expires: _____

INSURANCE REQUIREMENTS

The contractor/vendor shall procure, maintain, and provide proof of insurance coverage for injuries to persons or damages to property which may arise from or in connection with the work performed on behalf of the City by the contractor, his agents, representative, employees, or subcontractor. Such coverage shall be maintained by the contractor/vendor for the duration of the contract period.

Broad Form Commercial General Liability:

(Occurrence Form CG0001, Ed. 11/88):

\$1,000,000 CSL, BI &PD

Automobile Liability:

Code 1 "ANY AUTO" (Form CA0001 Ed. 6/92):

\$1,000,000 CSL, BI & PD

Workers' Compensation: Statutory Amount

Please state your ability to comply with these requirements

YES

NO

The insurance policies shall include or be endorsed to include the following provisions.

1. The City of Lynchburg, Virginia its officers/officials, employees, agents, and volunteers (the City), shall be added as “insureds” under the terms and conditions of the policies for liabilities which may arise out of the contractor/vendor’s operations or activities in these projects.
2. Any deductibles or self-insured retentions applicable to required coverages shall be paid by the contractor/vendor, and the City shall not be required to participate therewith.
3. The contractor/vendor shall agree to provide the City with 30 days written notice of any cancellation of or reduction in the required coverages.
4. The insurance required hereunder shall be primary and any insurance or self-insurance maintained by the City shall be excess of the contractors/vendor’s insurance and shall not contribute therewith.
5. Failure of the contractor/vendor to comply with any reporting provisions of the insurance policies required hereunder shall not affect coverage provided to the City.
6. All rights of subrogation against the City shall be waived.
7. The contractor/vendor shall provide the City with certificate of insurance with applicable endorsements effecting coverages, signed by a person authorized by the insurance company to bind coverage on its behalf. Certificates of insurance shall be received by the City within 5 days of notice of intent to award. Please state ability to comply _____.
8. All coverages for subcontractors of the contractor/vendors, if any, shall be subject to all of the requirements stated herein.

INSTRUCTIONS TO BIDDERS

DESCRIPTION OF WORK

The work included under this contract shall consist of all labor, materials, equipment, and the performance of all work necessary to complete the project known as “Carroll Avenue Pump Station Generator”. This work shall be performed in accordance with the project plans, specifications and Project Manual.

1. General: To be valid for consideration, bids must be completed and submitted in accordance with these instructions to bidders. All individual bid unit price items must be filled in regardless of the quantity shown.
2. Bidding documents will be provided as indicated in the Advertisement.
3. Qualification of Bidders: Each bidder must be prepared to submit within five calendar days of the Owner’s request written evidence of their qualifications for the project including financial data, previous experience, and evidence of authority to conduct business in the jurisdiction where the project is located.
4. Examination of Bid Documents and Site:
 - 4.1 Before submitting bids, each bidder must examine bid documents thoroughly; familiarize themselves with Federal, State and local laws, ordinances, rules, and regulations affecting the work; and correlate their observations with requirements of the bid documents.
 - 4.2 Bidders are requested and expected to visit the site of the project to alert themselves to local and special conditions which may be encountered during construction of the project such as: Labor and transportation, handling and storage of materials, the availability of materials, and site access. Failure to make such investigations shall not relieve the successful bidder from performing and completing the work in accordance with the contract documents.
 - a. An optional pre-bid conference will be held at the time and place stated in the Advertisement.
5. Clarification:
 - 5.1 No oral clarification of the bid documents will be made to any bidder. To be given consideration, requests for clarification must be received in time to allow preparation of written response at least seven (7) days prior to date fixed for opening of bids. Clarifications will be issued in the form of written addenda to the bid documents and posted to the Procurement Website within five (5) days of the bid opening. Only clarification by formal written addenda will be binding.
 - 5.2 All communications in regard to clarifications and any other matters related to this project shall be addressed to: Stephanie Suter, Procurement Division, 900 Church Street, Lynchburg, VA 24504, Fax:434-845-0711, email: stephanie.suter@lynchburgva.gov

6. Substitutions:

6.1 Substitutions of material or equipment or both may be offered by the Contractor with his bid, provided that, if approved:

- a. No major changes in the construction or design intent of the project would be required. Changes required to accommodate substituted items shall be made by the Contractor at no additional cost or time delay.
- b. Features of quality, capacity, construction, performance, appearance, size, arrangement, and general utility including economy of operation of substitutes offered, either parallel or exceed those of specified products.
- c. The provisions of the General Requirements and any other guarantees, if required by the specification sections, shall apply in full force and effect to the performance of such substitute products, approved for incorporation into the Work.

6.2 Technical data covering the proposed substitution shall be furnished with the bid when possible, and not later than 10 days after bid submission.

7. Bid Submission:

7.1 Submit bids using forms furnished in the Project Manual and fill in all blank spaces on the form. Repeat notation "Contractor's Current Virginia License No. _____" on outside of inner envelope containing bid and bid security, and place this envelope within another envelope addressed to:

City of Lynchburg
Procurement Division
900 Church Street
Third Floor, City Hall
Lynchburg, VA 24504

Bidders shall include the following with their bid submission:

- Bid Form
- Statement of Experience
- Statement of Available Resources
- Equal Opportunity Report Statement
- Certification of Nondiscrimination and Anti-Collusion (failure to sign and notarize this statement may result in rejection of the bid)
- Insurance Requirements
- Corporate Status Form
- Bid Bond

7.2 Both the inner and outer envelopes shall have noted thereon:

- a. "Sealed Bid Enclosed for the Carroll Avenue Pump Generator";
- b. Project Number 04036-W;

- c. The bidder's name and address;
 - d. Repeat notation "Current Registered Virginia Contractor No. _____" on the outside envelope.
- 7.3 Each bid must be accompanied by a cashier's check on a bank satisfactory to the City or a Bid Bond in the amount of five percent (5%) of the amount of the total base bid, made payable to the City, as assurance that the successful bidder will enter into contract within ten (10) days after Notice of Award.

If the successful bidder default's by failure to enter into contract and filing applicable bonds, the certified check or Bid Bond accompanying the successful bid shall be collected by the City, not as a penalty but as liquidated damages for delays and such additional expenses as may be incurred by the City for reasons of such default.
- 7.4 Contractors will indicate a unit price for each item listed on the bid form. The listed bid items are to contain all necessary cost required for completion of the item of work. Any changes, erasures, modifications, or deletions in the bid form, or alternate proposals not specified in the bid proposal shall make the proposal irregular and subject to rejection.
- 7.5 Receipt deadline for bids will be as stated in the Advertisement.
- 7.6 Bids will be opened publicly in accordance with Advertisement.
- 7.7 Withdrawal of bids after date for submission: In accordance with the provisions of sec. 2.2-4330 of the Virginia Public Procurement Act, a bidder will have two business days after the opening of bids within which to claim, in writing, any mistake as defined and withdraw their bid, provided such mistake be proved from the Contractor's work papers.
 - a. Definition: Contractor's work papers are the original work papers, documents, and materials used in the preparation of the bid as referred to in Section 2.2-4330 of the Virginia Public Procurement Act.
- 8. Bonds and Damages:
 - 8.1 Bonds shall be with a surety company acceptable to the Owner.
 - 8.2 A performance bond and a labor and material payment bond will be required in the amount of 100 percent of the bid.
 - 8.3 Liquidated damages shall be paid as indicated in the Construction Agreement.
- 9. Award of Contract:
 - 9.1 The award of the contract will be to the responsible bidder submitting the lowest base bid whose qualifications indicate the award will be in the best interest of the Owner and whose bid meets the prescribed requirements.

Selection of the successful project contractor will include a serious evaluation of whether the competitor has conscientiously attempted to meet DBE goals. A requirement of the contract agreement will be that a genuine concerted effort will be utilized to meet the contract goal.

- 9.2 Before the contract is awarded, the Contractor submitting the lowest bid must satisfy the City that they have the requisite organization, capital, equipment, ability, personnel, and at least five years experience in municipal type work for which they have submitted a bid. Each bidder shall, with his bid, submit a list of at least five projects of similar size and dollar value completed within the last five years, giving location, dollar value, year completed, and the name(s) of the Owner(s) and Engineer(s). The Contractor shall verify to the City that it has the sufficient and qualified personnel to provide for the contact work. Failure by the lowest bidder to sufficiently satisfy the City of its ability to meet any of the above requirements will serve as grounds for rejection of the bid.
- 9.3 The Owner reserves the right to reject any and all bids and waive any and all informalities and the right to disregard all conforming, nonconforming, conditional bids or counterproposals.
- 9.4 Unless canceled or rejected, a responsive bid from the lowest responsible bidder shall be accepted as submitted, except that if the bid from the lowest responsible bidder exceeds available funds, pursuant to Section 18-158 of the Lynchburg Procurement Ordinance, the Owner may negotiate with the apparent low bidder to obtain a contract price within available funds.
 - a. Procedures for Negotiations: If the Owner wishes to negotiate with the apparent low bidder to obtain a contract price within available funds, negotiations shall be conducted in accordance with the following procedures:
 1. The using agency shall provide the Procurement Administrator, with a written determination that the apparent low bid exceeds available funds. Said determination shall be confirmed in writing by the Director of Finance or his designee. The using agency shall also provide the appropriate Procurement Administrator with a suggested reduction in scope for the proposed purchase.
 2. The Procurement Administrator of the using agency shall advise the lowest responsible bidder, in writing, that the proposed purchase exceeds available funds. The Procurement Administrator shall further suggest a reduction in scope from the proposed purchase, and invite the lowest responsible bidder to amend its bid proposal based upon the proposed reduction in scope.
 3. Repetitive informal discussions with the lowest responsible bidder for purposes of obtaining a contract within available funds shall be permissible.
 4. The lowest responsible bidder shall submit a written Addendum to its original bid, which Addendum shall include: The change in scope for

the proposed purchase, the reduction in price, and the new contract value.

5. If the proposed Addendum is acceptable to the Owner, the Owner may award a contract within funds available to the lowest responsible bidder based upon the amended bid proposal.
 6. If the Owner and the lowest responsible bidder cannot negotiate a contract within available funds, all bids shall be rejected.
- 9.5 Submission of post-bid information shall be in accordance with the contract documents.

End of Instructions to Bidders

CONSTRUCTION AGREEMENT

This Agreement made and entered into on the ____ day of _____, 20____, by and between _____, party of the first part, hereinafter referred to as Contractor, and the City of Lynchburg, a municipal corporation of the Commonwealth of Virginia, party of the second part, hereinafter referred to as the Owner.

That the Contractor, for the consideration hereinafter fully set out, hereby agrees with the Owner as follows:

1. That the Contractor shall furnish all labor, materials, tools, and equipment and perform all work in manner and form as contained in the Project Manual and Drawings, dated February 2005, for the and all other specifications as referenced in these documents.
2. That the Contractor shall commence work within ten (10) days after award of the Contract and Notice to Proceed with the work under contract, and shall substantially complete the work within 150 days. Owner and Contractor recognize that time is of the essence of this Agreement and that the Owner will suffer financial loss if the work is not completed within the times specified in the Notice To Proceed, plus any extensions thereof allowed in accordance with the General Conditions. They also recognize the delays, expense and difficulties involved in providing the actual loss suffered by Owner if the work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty) Contractor shall pay Two Hundred Dollars (\$200.00) for each day that expires after the time specified for completion. If the Contractor is subject to liquidated damages the City has the right to withhold the liquidated damages from the Contractor's regular payments or retainage.
3. The Owner hereby agrees to pay the Contractor for the faithful performance of this Agreement subject to additions and deductions as provided in the Specifications or Proposal, in lawful money of the United States, as follows:

Dollars

(\$ _____)

4. The Owner shall make partial payment on a monthly basis to the Contractor on the basis of a duly certified and approved estimate of work performed during the preceding calendar month by the Contractor, less five percent (5%) of the amount of such estimate which is to be retained by the Owner until all work has been performed strictly in accordance with this Agreement and until such work has been accepted by the Owner.
5. Upon submission by the Contractor of evidence satisfactory to the Owner that all payrolls, material bills and other costs incurred by the Contractor in connection with the construction of the work have been paid in full, final payment on account of this Agreement shall be made within 90 days after the completion by the Contractor of all work covered by this Agreement and the acceptance of such work by the Owner.
6. It is further mutually agreed between the parties hereto that if, at any time after the execution of this Agreement and Surety Bond hereto attached for its faithful performance, the Owner shall deem the surety or sureties upon such bond to be unsatisfactory, or if for any reason, such bond ceases to be adequate to cover the performance of the work, the Contractor shall at its expense, within five (5) days after the receipt of notice from the Owner so to do, furnish an additional bond or bonds in such form and amount, and with such surety or sureties as shall be satisfactory to the owner. In such event no further payment to the Contractor shall be deemed to be due under this Agreement until such new or additional

security for the faithful performance of the work shall be furnished in manner and form satisfactory to the Owner.

7. Contractor agrees to fulfill all requirements of State, Federal, and Municipal laws which may be applicable to this project.

This Agreement is executed in two counterparts, each of which shall, without proof or accounting for the other counterparts, be deemed an original contract.

IN WITNESS WHEREOF, _____ has caused its name to be subscribed to this Agreement by _____, its _____, and its corporate seal to be hereunto affixed and attested by _____, its _____, said officers being duly authorized therefore; and the City of Lynchburg has caused its name to be hereunto subscribed by Walter Erwin, its Acting City Manager, and its corporate seal to be hereunto affixed and attested by Patricia Kost, its Clerk of Council, said officers being duly authorized therefore, all as to the day and year first above written.

(Contractor)

(SEAL)

BY: _____

ATTEST: _____

CITY OF LYNCHBURG

(SEAL)

BY: _____
City Manager

ATTEST:

Clerk of Council

APPROVED:

City Attorney

CONTRACT BOND

KNOW ALL MEN BY THESE PRESENTS: That we _____
(Hereinafter called the Principal) and _____
(Hereinafter called the Surety) are held and firmly bond unto the City of Lynchburg, a Municipal Corporation of the Commonwealth of Virginia (Hereinafter called the Owner) in the penal sum of

_____ DOLLARS
(\$ _____) for the payment of which we bind ourselves, our heirs, executors, administrators, successors, and assigns for the faithful performance of a certain written contract, dated the _____ day of _____, 20____, entered into between the Principal and City of Lynchburg, for _____ (project).

NOW, THEREFORE, the condition of this obligation is such that if the Principal shall faithfully perform the terms and conditions of the contract in all respects on his or its part and shall fully pay all obligations incurred in connection with the performance of such contractor on account of labor and materials used in connection therewith and all such obligations of every form, nature, and character, and shall save harmless the Owner from any and all liability of every nature, kind, and character which may be incurred in connection with the performance or fulfillment of such contract on the part of the Principal or other such liability resulting from negligence or otherwise on the part of the Principal, and further shall save harmless the Owner from all costs and damage which may be suffered by reason of the failure of the Principal to fully and completely perform said contract, and shall fully reimburse and repay the Owner for all expenditures of every kind, character, and description which may be incurred by the Owner in connection with making good any and every default which may exist on the part of the Principal in connection with the performance of said contract; and further that if the Principal shall pay all lawful claims of all persons, firms, partnerships or corporations for labor performed and materials furnished in connection with the performance of the contract (we agreeing that failure so to do shall give such persons, firms, partnerships or corporations a direct right of action against either the Principal or Surety under this obligation, or both said Principal and Surety), then this obligation shall be void, otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated;

PROVIDED HOWEVER, that this bond is issued subject to the following conditions and privileges:

1. That no suit, action or proceeding by reason of any default whatever on the part of the Principal shall be brought on this bond after one year from the date on which final payment on the contract falls due;
2. That any alterations or additions which may be made under the contract or the work to be done under it or the giving by the Owner of any extension of time for the performance of the Contract, or any other forbearance on the part of either the Owner or the Principal shall not in any way release the Principal and Surety, or either of them, their heirs, executors, administrator, successors or assigns, from their liability hereunder, notice to the Surety of any such alterations, extensions or forbearances being expressly waived.

Executed in two counterparts.

IN WITNESS WHEREOF, _____, the Principal, has caused its name to be hereunto subscribed and its corporate seal to be hereunto affixed and duly attested by its proper officers heretofore duly authorized this _____ day of _____, 20____, and the Surety has caused its name to be hereunto subscribed and its seal affixed by its authorized Attorney-in-Fact.

BY: _____
President

(SEAL)

ATTEST:

Secretary

BY: _____
Attorney-in-Fact

ESCROW AGREEMENT

THIS AGREEMENT, made and entered into this ____ day of _____, 20____ by,
between and among the City of Lynchburg ("City"), _____ ("Contractor"),

(Name of Bank)

(Address of Bank)

a trust company, bank, or savings and loan institution with its principal office located in the Commonwealth of Virginia (hereinafter referred to collectively as "Bank"), and

("Surety") provides:

I.

The City and the Contractor have entered into a contract with respect to City.

Project No. and Name: _____ ("the Contract").

This agreement is pursuant to, but in no way amends or modifies, the Contract. Payments made hereunder or the release of funds from escrow shall not be deemed approval or acceptance of performance by the Contractor.

II.

In order to assure full and satisfactory performance by the Contractor of its obligations under the Contract, the City's Director of Finance is required thereby to retain certain amounts otherwise due the Contractor. The Contractor has, with the approval of the City, elected to have these retained amounts held in escrow by the Bank. This agreement sets forth the terms of the escrow. The Bank shall not be deemed a part to, bound by, or required to inquire into the terms of, the Contract or any other instrument or agreement between the City and the Contractor.

III.

The City shall from time to time pursuant to its contract pay to the Bank amounts retained by it under the Contract. Except as to amounts actually withdrawn from escrow by the City, the Contractor shall look solely to the Bank for payment of funds retained under the Contract and paid by the City to the Bank.

The risk of loss by diminution of the principal of any funds invested under the terms of this contract shall be solely upon the Contractor.

Funds and securities held by the Bank pursuant to this Escrow Agreement shall not be subject to levy, garnishment, attachment, lien, or other process whatsoever. Contractor agrees not to assign, pledge, discount, sell or otherwise transfer or dispose of his interest in the escrow account or any part thereof, except to the Surety.

IV.

Upon receipt of checks or warrants drawn by the Director of Finance and made payable to it as escrow agent, the Bank shall promptly notify the Contractor, negotiate the same and deposit or invest and

reinvest the proceeds in approved securities in accordance with the written instruction of the Contractor. In no event shall the Bank invest the escrowed funds in any security not approved.

V.

The following securities, and none other, are approved securities for all purposes of this Agreement:

- (1) United States Treasury Bonds, United States Treasury Notes, United States Treasury Certificates of Indebtedness or United States Treasury Bills,
- (2) Bonds, notes and other evidences of indebtedness unconditionally guaranteed as to the payment of principal and interest by the United States,
- (3) Bonds or notes of the City,
- (4) Bonds of any political subdivision of the City, if such bonds carried, at the time of purchase by the Bank or deposit by the Contractor, a Standard and Poor's or Moody's Investors Service rating of at least "A", and
- (5) Certificates of deposit issued by commercial Banks located within the Commonwealth, including, but not limited to, those insured by the Bank and its affiliates,
- (6) Any bonds, notes, or other evidences of indebtedness listed in Section (1) through (3) may be purchased pursuant to a repurchase agreement with a Bank, within or without the City having a combined capital, surplus and undivided profit of not less than \$25,000,000 provided the obligation of the Bank to repurchase is within the time limitations established for investments as set forth herein. The repurchase agreement shall be considered a purchase of such securities even if title, and/or possession of such securities is not transferred to the Escrow Agent, so long as the repurchase obligation of the Bank is collateralized by the securities themselves, and the securities have on the date of the repurchase agreement a fair market value equal to at least 100 percent of the amount of the repurchase obligation of the Bank, and the securities are held by a third party, and segregated from other securities owned by the Bank.

No security is approved hereunder, which matures more than five years after the date of its purchase by the Bank or deposit by the Contractor.

VI.

The Contractor may from time to time withdraw the whole or any portion of the escrowed funds by depositing with the Bank approved securities in an amount equal to, or in excess of, the amount so withdrawn. Any securities so deposited or withdrawn shall be valued at such time of deposit or withdrawal at the lower of par or market value, the latter as determined by the Bank. Any securities so deposited shall thereupon become a part of the escrowed fund.

Upon receipt of a direction signed by the City's Director of Public Works or the City Engineer, the Director of Finance or the City Accountant shall authorize the Bank to pay the principal of the fund, or any specified amount thereof, to the account of the City of Lynchburg. Such payment shall be made in cash as soon as is practicable after receipt of the direction.

Upon receipt of a direction signed by the City's Director of Public Works or the City Engineer, the Director of Finance or the City Accountant shall authorize the Bank to pay and deliver the principal of the fund, or any specified amount thereof, to the Contractor, in cash or in kind, as may be specified by the Contractor. Such payment and delivery shall be made as soon as is practicable after receipt of the direction.

VII.

For its services, hereunder the Bank shall be entitled to a reasonable fee in accordance with its published schedule of fees or as may be agreed upon by the Bank and the Contractor. Such fee and any other costs of administration of this Agreement shall be paid from the income earned upon the escrowed fund and, if such income is not sufficient to pay the same, by the Contractor.

VIII.

The net income earned and received upon the principal of the escrowed fund shall be paid over to the Contractor in quarterly or more frequent installments. Until so paid or applied to pay the Bank's fee or any other costs of administration such income shall be deemed a part of the principal of the fund.

IX.

The Surety undertakes no obligation hereby but joins in this Agreement for the sole purpose of acknowledging that its obligations as surety for the Contractor's performance of the Contract are not affected hereby.

WITNESS the following signatures, all as of the day and year first above written.

CITY OF LYNCHBURG

CONTRACTOR: _____

BY: _____
City Manager

BY: _____
Officer, Partner, or Owner (Seal)

GENERAL CONDITIONS

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ARTICLE 2	ARCHITECT/ENGINEER
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GENERAL CONDITIONS

ARTICLE 1 CONTRACT DOCUMENTS

1.1 DEFINITIONS

1.1.1 CONTRACT AND CONTRACT DOCUMENTS:

The Contract Documents include the Construction Agreement and its attachments: the City's Invitation for Bid NO. 04036-W dated February 2005 and any addenda, the Contractor's bid dated March 23, 2005, the Contract Plans and Specifications and any addenda. Any soils, geotechnical or other reports, surveys and analyses which may be made available to the Contractor for review or information under this Contract, are not adopted by reference into, nor are they part of the Contract Documents.

1.1.2 MODIFICATION:

A Modification is (1) a written Amendment to the Contract signed by both parties (Project Manager for City of Lynchburg and authorized Agent for the Contractor), (2) a written Field Change Order signed by the Project Manager or Owners authorized representative and an Authorized Agent for the Contractor, (Field Change Orders are limited to no more than 25% above the Contract amount originally authorized by the City Manager. Change Orders exceeding this limitation must have the specific approval of City Council.

1.1.3 WORK:

The term "Work" as used herein refers to work at the site of the project, is that normally done at the location of the project and includes all plant, labor, materials, supplies, equipment and other facilities and things necessary or proper for or incidental to the carrying out and completion of this contract. The term "Work" shall be construed to include material suitably stored and protected.

1.1.4 PROJECT:

The Project is the total construction of which the Work performed under Contract Documents may be the whole or a part.

1.1.5 FURNISH, INSTALL, PROVIDE:

The terms "Furnish" or "Install" or "Provide", unless specifically limited in context, mean: furnishing and incorporating a specified item, product or material in the work, including all necessary labor, materials, equipment to perform the work required, ready for use.

1.1.6 EXTRA WORK:

The term "Extra Work" as used herein, refers to and includes work required by the Owner, which, in the judgment of the Owner involves changes in or additions to that required by the drawings, specifications and addenda in their present form.

1.1.7 NOTICE OF AWARD:

The written notice of the acceptance of the Contractor's bid from the Owner to the Successful Bidder.

1.1.8 NOTICE:

The term "Notice" as used herein shall mean and include written notice. Written Notice shall be deemed to have been delivered to:

If to Owner:

Department of Public Works
Utilities Division
525 Taylor Street
Lynchburg, Virginia 24501

Procurement Division
3rd Floor, City Hall
900 Church Street
Lynchburg, Virginia 24504

City Attorney
3rd Floor, City Hall
900 Church Street
Lynchburg, Virginia 24504

If to Contractor:

(Insert Successful bidder name and address)

Delivery shall be by special courier, recognized overnight delivery service, or United States mail. With the exception of original bid documents, facsimile copies and e-mail shall be acceptable if the original is received by special courier, recognized overnight delivery service, or United States mail within three business days.

1.1.9 **MISCELLANEOUS WORDS OR TERMS:**

Whenever they refer to the work or its performance, "directed", "required", "permitted", "ordered", "designated", "prescribed", and words of like import shall imply the direction, requirements, permission, order, designation or prescription of the Owner and "approved", "acceptable", "satisfactory", "in the judgment of" and words of like import shall mean approved by or acceptable to or satisfactory to or in the judgment of the Owner.

1.2 EXECUTION, CORRELATION AND INTENT OF CONTRACT DOCUMENTS

1.2.1 Two originals of the Construction Agreement, shall be executed.

1.2.2 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work. The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all. Words and abbreviations which have well-known technical or trade meanings are used in the Contract Documents in accordance with such recognized meanings.

1.2.3 Anything shown on the drawings and not mentioned in the specifications or mentioned in the specifications and not shown on the drawings shall have the same effect as if shown or mentioned respectively in both. Technical specifications take priority over general specifications and detail drawings take precedence over general drawings. Any conflict or inconsistency in the drawings shall be submitted by the Contractor to the A/E, with a copy to the Owner. The A/E's decision thereon shall be final. In case of conflict or inconsistency between the drawings and the specifications, the specifications shall govern.

1.2.4 Should any labor or material be required which is not denoted in the drawings and specifications, but which is, nevertheless, reasonably necessary for the proper carrying out of the intent of the Work, it is agreed that the labor or material is implied and the Contractor shall provide such labor and furnish such materials as fully as if they were completely delineated and prescribed without additional cost to the Owner.

1.2.5 The Contractor may be furnished additional instructions and detail drawings to carry out the work included in the Contract. The additional drawings and instructions thus supplied to the Contractor will coordinate with the Contract Documents and will be so prepared that they can be reasonably interpreted as a part thereof. The Contractor shall carry out the work in accordance with the additional detail drawings and instructions.

- 1.2.6 The drawings and specifications are divided into sections for convenience and clarity only. The Contractor shall not construe this as a division of the work into various subcontractor units. The Contractor may subcontract the Work in such divisions as he sees fit, but he is ultimately responsible for furnishing all work shown on the drawings and in the specifications.
- 1.2.7 The provisions of this Contract cannot be amended, modified, varied or waived in any respect except by a Modification. **The Contractor is hereby given notice that no person has authority to orally waive, or to release the Contractor from any of the Contractor's duties or obligations under or arising out of this Contract.** Any waiver, approval or consent granted by Modification to the Contractor shall be limited to those matters specifically and expressly stated thereby to be waived, approved or consented to and shall not relieve the Contractor of the obligation to obtain any future waiver, approval or consent.

1.3 OWNERSHIP AND USE OF DOCUMENTS

- 1.3.1 All Drawings, Specifications, and memoranda relating to the Work are the property of the Owner and are to be used only for the Project.

ARTICLE 2 ARCHITECT/ENGINEER

2.1 DEFINITIONS

- 2.1.1 The term Architect/Engineer, hereinafter "A/E" or "Architect" or "Engineer", shall mean the consulting firm or City Department/Division, or their duly authorized representatives, lawfully licensed to practice in Virginia, that is responsible for designing or engineering the work, and performing the activities specified herein.
- 2.1.2 The A/E is referred to throughout the Contract Documents as if singular in number and masculine in gender. The A/E is further described as one of the following:

2.2 ARCHITECT/ENGINEER STATUS

- 2.2.1 The A/E will provide services as described in these General Conditions.
- 2.2.2 The A/E will advise and consult with the Owner. The Owner's instructions to the Contractor may be forwarded through the A/E. The A/E will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise changed by Modification.
- 2.2.3 The A/E may visit the site at intervals appropriate to the stage of construction to familiarize himself generally with the progress and quality of the Work and to determine in general if the Work is proceeding in accordance with the Contract Documents. The Contractor may not rely on the A/E to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work.
- 2.2.4 The A/E will immediately inform the Owner and Contractor whenever in the reasonable opinion of the A/E any of the Work is proceeding contrary to the requirements of the Contract Documents and will be unacceptable. Such notification by the A/E will not be a cause for the Contractor to claim either delay of the Work or any increase in the Contract Sum.
- 2.2.5 The A/E, the Owner and other governmental representatives shall at all times have access to the Work wherever it is in preparation and progress. The Contractor shall provide facilities for such access so that the A/E, the Owner and other governmental representatives may perform their functions under the Contract Documents.

- 2.2.6 Where applicable, based on the A/E's observations and an evaluation of the Contractor's Applications for Payment, the A/E will recommend the amounts owing to the Contractor and will issue Certificates for Payment in such amounts, as provided in Article 9 Payments and Completion.
- 2.2.7 The A/E will be an interpreter of the requirements of the plans, drawings, and specifications. The A/E will render interpretations necessary for the proper execution and progress of the Work, with reasonable promptness and in accordance with any time limit agreed upon. Either party to the Contract may make written request to the A/E for such interpretations. All interpretations of the A/E shall be consistent with the intent of and reasonably inferable from the plans, drawings, and specifications and will be in writing and/or in the form of drawings.
- 2.2.8 The A/E will recommend to the Owner the rejection of work that does not conform to the plans, drawings, and specifications. Whenever, in his opinion, he considers it necessary or advisable for the implementation of the intent of the Contract Documents, he will have authority to require special inspection or testing of the work in accordance with Subparagraph 7.6.2 whether or not such Work be then fabricated, installed or completed.
- 2.2.9 The A/E will review and approve or take other appropriate action upon Contractor's submittals such as Shop Drawings, Product Data, Samples and Manuals, but only for conformance with the design concept of the Work and with the information given in the plans, drawings, and specifications. The A/E approval of a specific item shall not indicate approval of an assembly of which the item is a component.
- 2.2.10 The A/E's acceptance of materials or products on behalf of the Owner shall not bar future rejection of such items if they are subsequently found to be defective or inferior in quality or uniformity to the materials or products specified by the Contract, or if such items are not as represented by the Contractor.
- 2.2.11 As required, the A/E will conduct inspections to assist the Owner in determining the dates of Substantial Completion and Final Completion, will receive and forward to the Owner for the Owner's review written warranties and related documents required by the Contract and assembled by the Contractor, and will recommend final Certificate for Payment upon compliance with the requirements of Article 9 Payment and Completion.
- 2.2.12 All claims, disputes, or other matters or questions between the Contractor and Owner arising out of or relating to the A/E's interpretation of the Contract Documents or any other decisions, communications, or actions of the A/E arising out of or relating to the performance of the Work shall be resolved as set forth in Article 12 Changes and Modifications in the Work.
- 2.2.13 In case of the termination of the employment of the A/E, the Owner shall appoint a new A/E, who shall have the same status under the Contract Documents as the former A/E.

ARTICLE 3 OWNER

3.1 DEFINITION

- 3.1.1 The Owner is the City of Lynchburg, Virginia and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Owner means the Owner or its authorized representative. The Director, Department of Public Works or his designee is the authorized Owners representative for this contract.
- 3.1.2 The Department of Public Works, City of Lynchburg will designate a single Owner's representative, with the title of Project Manager (PM), who will have the power to act, within the scope of his delegated authority, for and on behalf of the Owner, in accordance with the terms of the Contract.

- 3.1.3 For purposes of change in the work, the term "Owner" or "Owner's representative" specifically excludes any and all inspectors having building code or City ordinance responsibilities or jurisdiction under the requirements of the Building Permit.

3.2 INFORMATION POSSESSED BY OWNER

- 3.2.1 The Owner, as a courtesy, will make available for the Contractor's reasonable review, at the Owner's offices or together with the Contract Documents, certain boring logs, geotechnical, soils and other reports, surveys and analyses pertaining to the Contract site of which the Owner is aware and has in its possession. Any boring logs that are provided to the Contractor, are only intended to reflect conditions at the locations of the borings and do not necessarily reflect site conditions at other locations on the site. Any reports surveys and analyses provided by Owner are for the Contractor's information only, and their accuracy and completeness are not guaranteed or warranted by the Owner or the A/E, and such reports are not adopted by reference into, nor are they part of the Contract Documents.
- 3.2.1.1 Notwithstanding any factual statement, conclusion, or any language or recommendations contained in such reports, the Contractor assumes full responsibility for inspection of the site and for the means and methods of construction that he employs when performing the work. The Owner shall not be liable for any additional work or costs arising as a result of any conclusions reached or assumptions derived by the Contractor from or based upon any such geotechnical, soils and other reports, surveys and analyses which the Owner makes available for the Contractor's information and review.

3.3 OWNER-PAID PERMITS AND FEES

- 3.3.1 The Owner will, where applicable, pay for:
- .1 Sewer availability fees;
 - .2 Water availability/meter connection fee;
 - .3 Electrical, natural gas, telephone, and cable TV permanent installation charges;
 - .4 Any easements required;
 - .5 Permits for work in Virginia Department of Transportation (VDOT) right-of-way. The Contractor is required to comply with the General Requirement for work in the VDOT right-of-way as outlined in the The Manual of Specifications and Standard Details, 2004 for the City of Lynchburg, and the VDOT Manual for this work. Upon completion of all work in the VDOT right-of-way, the VDOT Personnel will conduct an inspection and issue a punch list. The Contractor shall be responsible for completion of those items on the punch list and the written release of the Permit.
- 3.3.2. The Contractor's attention is directed to Article 4.7 Contractor-Paid Taxes, Permits, Fees, and Notices describing other permits to be obtained and fees to be paid by the Contractor.
- 3.3.3 The foregoing are in addition to other duties and responsibilities of the Owner enumerated elsewhere in the Contract Documents.

3.4 OWNER'S RIGHT TO STOP WORK

- 3.4.1 If the Contractor fails to correct defective Work as required herein or persistently fails to carry out the Work in accordance with the Contract Documents, the Owner, by a written order, may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Owner to stop the Work shall not give rise to any duty

on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity.

3.5 OWNER'S RIGHT TO CARRY OUT THE WORK

- 3.5.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within seven (7) days after receipt of written Notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to any other remedy he may have, rectify such deficiencies as outlined in Section 6.1 Owner's Right to Perform Work and to Award Separate Contracts. In such case an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the A/E's additional services made necessary by such default, neglect or failure. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.
- 3.5.2 Neither the Owner nor the A/E nor their officers, agents, assigns or employees are in any way liable or accountable to the Contractor or his surety for the method by which work performed by the Owner, or at the Owner's direction, or any portion thereof, is accomplished or for price paid therefore. Notwithstanding the Owner's right to carry out a portion of the Work, maintenance and protection of the Work remains the Contractor's and Surety's responsibility as provided for in the Performance Bond and Guarantee of Contractor, pursuant, but not limited, to Articles 4 Contractor and 13 Uncovering and Correction of Work.

3.6 SUSPENSION OF WORK

- 3.6.1 The Owner shall have the authority to suspend the Work, in whole or in part, for such periods and such reasons as the Owner may deem necessary or desirable, in its sole discretion, including without limitation:
- .1 Unsuitable weather;
 - .2 Other conditions considered unfavorable for the suitable prosecution of the Work; and/or
 - .3 Other conditions considered adverse to the best interests of the Owner.
- 3.6.2 Any such suspension shall be in writing to the Contractor. The Contractor shall obey immediately such orders of the Owner and shall not resume the Work until so ordered in writing by the Owner. The Contractor shall be entitled to an extension of the Contract Time subject to the provisions of Article 8 Contract Time herein.
- 3.6.3 No such suspension of the Work shall be the basis of a claim by the Contractor for any increase in the Contract Sum or for any other damages, losses, costs or expenses whatsoever provided that the suspension is for a reasonable time, under the circumstances then existing and the cause thereof is beyond the control and is without the fault or negligence of the Owner.
- 3.6.4 In the event of suspension of Work, the Contractor will and will cause his subcontractors to protect carefully his and their materials and work against damage or injury from the weather and maintain completed and uncompleted portions of the work as required by the Contract Documents. If, in the opinion of the Owner any work or material shall have been damaged or injured by reason of failure on the part of the Contractor or any of his subcontractors to so protect same, such work and materials shall be removed and replaced at the expense of the Contractor.

3.7 USE AND OCCUPANCY PRIOR TO FINAL ACCEPTANCE BY OWNER

- 3.7.1 The Owner has the right to take possession of and use any completed or partially completed portions of the Work, notwithstanding that the time for completing the entire Work or any

portions thereof may, or may not, have expired. The taking of possession and use by the Owner shall be in accordance with the provisions regarding Substantial Completion in Article 9.8 Substantial Completion and Guarantee Bond. If such prior use delays the Work, the Contractor may submit a request for a time extension in accordance with the requirements of Article 8 Contract Time.

3.8 RIGHT TO AUDIT AND PRESERVATION OF RECORDS

- 3.8.1 The Contractor shall maintain books, records and accounts of all costs in accordance with generally accepted accounting principles and practices. The Owner or its authorized representative shall have the right to audit the books, records and accounts of the Contractor under any of the following conditions:
- .1 If the Contract is terminated for any reason in accordance with the provisions of these Contract Documents in order to arrive at equitable termination costs;
 - .2 In the event of a disagreement between the Contractor and the Owner on the amount due the Contractor under the terms of this Contract;
 - .3 To check or substantiate any amounts invoiced or paid which are required to reflect the costs of the Contractor, or the Contractor's efficiency or effectiveness under this Contract or in connection with extras, changes, claims, additions, backcharges, or other, as may be provided for in this Contract; and/or
 - .4 If it becomes necessary to determine the Owner's rights and the Contractor's obligations under the Contract or to ascertain facts relative to any claim against the Contractor which may result in a charge against the Owner.
- 3.8.2 These provisions for an audit shall give the Owner unlimited access during normal working hours to the Contractor's books and records under the conditions stated above.
- 3.8.3 The Contractor shall make all his books, records, documents, and other evidence bearing on his costs and expenses under this Contract available to the Owner for a period of three years after final payment or termination hereunder
- 3.8.4 All payments under this Contract are subject to audit under the circumstances stated above. Audits may be performed at the Owner's option, either during the Contract time period or during the above record retention time period. Regardless of authorization, approval or acceptance, signatures or letters which are given by the Owner and are part of the Owner's control systems or are requested by the Contractor, the payments made under this Contract shall not constitute a waiver of the Owner's right to audit. Payments shall not constitute a waiver or agreement by the Owner that it accepts as correct the billings, invoices or other charges on which the payments are based. If the Owner's audit produces a claim against the Contractor, the Owner may pursue all its legal remedies even though it has made all or part of the payments required by this Contract.
- 3.8.5 If any audit by the Owner or the Owner's representative discloses an underpayment by the Owner, the Owner shall have the duty to pay any amounts found by the audit to be owed to the Contractor. If such audit discloses an overpayment, the Contractor shall have the obligation to reimburse the Owner for the amount of the overpayment.
- 3.8.6 The Owner's right to audit and the preservation of records shall terminate at the end of three (3) years as stated herein above. The Contractor shall include this "Right to Audit and Preservation of Records" clause in all subcontracts issued by him and he shall require same to be inserted by all lower tier Subcontractors in their subcontracts, for any portion of the work. Should Contractor fail to include this clause in any such Contract or lower tier Contract, or otherwise fail to insure

the Owner's rights hereunder, Contractor shall be liable to Owner for all cost, expenses and attorney's fees which Owner may have to incur in order to obtain an audit or inspection of or the restoration of records which would have otherwise been available to Owner from said persons under this clause. Such audit may be conducted by the Owner or its authorized representative.

3.9 *RIGHT TO REVIEW OTHER DOCUMENTS AND MATERIALS*

- 3.9.1 In addition to the rights granted to the Owner under Article 3.8 Right to Audit and Preservation of Records, the Owner shall have the right to review and copy any and all of the Contractor's records pertaining to or relating in any way to this project, including, but not limited to, correspondence, memoranda, minutes, reports, intra- and inter-office communications, work papers, estimating sheets, progress reports, forecasts, audio or video recordings, computer disks, films, or any other materials, regardless of physical form or characteristics, which were prepared by or in the possession of, or obtainable by, the Contractor. The Contractor shall make all such documents and records available to the Owner upon ten (10) days written Notice to the Contractor of the Owner's intent to review such documents. The Contractor shall include this "Right to Review Documents and Other Materials" clause in all subcontracts issued by him and he shall require same to be inserted by all lower-tier subcontractors in their subcontracts for any portion of the Work. The Contractor hereby waives any right he may have to additional compensation or time extensions in the event he fails or refuses to produce records pertaining to any such claim as requested by the Owner pursuant to this paragraph. In addition, the Owner may withhold all or any portion of any progress payments, which may be otherwise due, in the event Contractor refuses to comply with his obligations under this paragraph. The review of documents and other records under this clause may be conducted by the Owner or its authorized representatives.

ARTICLE 4 CONTRACTOR

4.1 *DEFINITION*

- 4.1.1 The Contractor is the person or entity identified in the Construction Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Contractor means the Contractor or his authorized representative.
- 4.1.2 This entire Contract is not one of agency by the Contractor for Owner but one in which the Contractor is engaged independently in the business of providing the services and performing the Work herein described as an independent Contractor.

4.2 *REVIEW OF CONTRACT DOCUMENTS*

- 4.2.1 The Contractor shall not perform any portion of the Work at any time without having obtained the Contract Documents or, where required, approved Shop Drawings, Product Data, Samples or Manuals for such portion of the Work
- 4.2.2 The Contractor and his Subcontractors shall keep at the site of the Work at least two (2) copies of the drawings and specifications and shall at all times give the A/E, inspectors, as well as representatives of the Owner access thereto. Further, said drawings shall be the approved sets issued to the Contractor by the appropriate City Permit agencies

4.3 *CONTRACTOR'S REPRESENTATIONS*

By entering into this Contract with the Owner, the Contractor represents and warrants the following, together with all other representations and warranties in the Contract Documents

- 4.3.1 That he is experienced in and competent to perform the type of work required and to furnish the plant, materials, supplies or equipment to be so performed or furnished by him;

- 4.3.2 That he is financially solvent, able to pay his debts as they mature, and possessed of sufficient working capital to initiate and complete the Work required under the Contract;
- 4.3.3 That he is familiar with all Federal, State, and Local Government laws, ordinances, permits, regulations and resolutions which may in any way affect the Work or those employed therein;
- 4.3.4 That such temporary and permanent work required by the Contract Documents which is to be done by him will be satisfactorily constructed and fit for use for its intended purpose and that such construction will not injure any person, or damage any property;
- 4.3.5 That he has carefully examined the Contract Documents and the site of the Work and that from his own investigations, he has satisfied himself and made himself familiar with: (1) the nature and location of the Work, (2) the character, quality and quantity of materials likely to be encountered, including, but not limited to, all structures and obstructions on or at the project site, both natural and man-made; (3) the character of equipment and other facilities needed for the performance of the Work, (4) the general and local conditions including without limitation its climatic conditions, the availability and cost of labor and the availability and cost of materials, tools and equipment; (5) the quality and quantity of all materials, supplies, tools, equipment, labor and professional services necessary to complete the Work in the manner required by the Contract Documents; and (6) all other matters or things which could in any manner affect the performance of the Work;
- 4.3.6 That he will fully comply with all requirements of the Contract Documents;
- 4.3.7 That he will perform the Work consistent with good workmanship, sound business practice, and in the most expeditious and economical manner consistent with the best interests of the Owner;
- 4.3.8 That he will furnish efficient business administration, an experienced superintendent, and an adequate supply of workmen, equipment, tools and materials at all times;
- 4.3.9 That he will complete the Work within the Contract Time;
- 4.3.10 That his Contract price is based upon the materials, systems and equipment required by the Contract Documents, without exception; and
- 4.3.11 That he has satisfied himself as to the feasibility and correctness of the Contract Documents for the construction of the Work.

4.4 SUPERVISION AND CONSTRUCTION PROCEDURES

- 4.4.1 The Contractor shall supervise and direct the Work, using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract; subject, however, to the Owner's right to reject means and methods proposed by the Contractor which are unsafe or otherwise not in compliance with the Contract Documents.
- 4.4.2 The Contractor shall be responsible to the Owner for the acts and omissions of his employees, Subcontractors and Sub-subcontractor's, suppliers, their agents and employees, and of other persons performing any of the Work and for their compliance with each and every requirement of the Contract Documents, in the same manner as if they were directly employed by the Contractor.
- 4.4.3 The Contractor understands and agrees that he shall not be relieved of his obligations to perform the Work in accordance with the Contract Documents either by the activities or duties of the

Owner or the A/E in their administration of the Contract or by inspections, tests, or approvals required or performed under Article 7 by persons other than the Contractor.

- 4.4.4 Before starting a section of work, the Contractor shall carefully examine all preparatory work that has been executed by others to receive his Work to see that it has been completed. He shall check carefully, by whatever means are required, to ensure that his Work and adjacent, related work will finish to proper quality, contours, planes, and levels.
- 4.4.5 The Contractor understands and agrees that the Owner and A/E will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, and they will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Owner and the A/E will not be responsible for or have control or charge over the acts or omissions of the Contractor, Subcontractors, or any of their agents or employees, or any other persons performing any of the Work.
- 4.4.6 The Contractor shall employ no plant, equipment, materials, or persons for this Work to which the Owner objects.
- 4.4.7 The Contractor shall not remove any portion of the Work or stored materials from the site of the Work.

4.5 LABOR, MATERIALS AND EQUIPMENT

- 4.5.1 The Contractor shall furnish all plant, labor, materials, supplies, equipment and other facilities and things necessary or proper for or incidental to the Work, and will perform all other obligations imposed on him by this Contract. Final payment will not be made until the Work is so completed.
- 4.5.2 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.
- 4.5.3 Work and materials which are necessary in the construction but which are not specifically referred to in the specifications or shown in the drawings but implied by the Contract shall be furnished by the Contractor at his own cost and expense. Such work and materials shall correspond with the general character of the Work as may be determined by the A/E subject to review as provided in Article 2.2.11.
- 4.5.4 The Contractor shall perform at least that percentage of the Work specified in the Construction Agreement, with forces that are in the direct employment of the Contractor's organization. The Contractor shall submit to the Owner within thirty (30) calendar days after award of the Contract for the Work, a designation of the Work to be performed by the Contractor with his own forces. The percentage of the Work to be performed under subcontract shall be calculated by adding the amounts of all subcontracts and dividing this sum by the total amount of the Contract.
- 4.5.5 The Contractor shall at all times enforce strict discipline, safety and good order among his employees and shall not employ on the Work any unfit person or anyone not skilled in the task assigned to him.

If any person employed on the Work by the Contractor shall appear to the Owner to be incompetent or to act in a disorderly or improper manner, such person shall be removed immediately at the request of the Owner, and shall not be reemployed except on written consent of the Owner.

- 4.5.6 No materials or supplies for the Work shall be purchased by the Contractor or by any subcontractor subject to any chattel mortgage, or under a conditional sale or other agreement by which an interest is retained by the seller. The Contractor warrants that he has good title to all materials and supplies used by him in the Work.
- 4.5.7 The Contractor shall provide approved and adequate sanitary accommodations. All wastes shall be covered, disinfected, incinerated or otherwise disposed of legally.
- 4.5.8 All equipment, apparatus and/or devices of any kind to be incorporated into the Work that are shown or indicated on the drawings or called for in the specifications or required for the completion of the Work shall be entirely satisfactory to the Owner as regards operations, capacity and/or performance. No approval, either written or verbal, of any drawings, descriptive data or samples of such equipment, apparatus, and/or device shall relieve the Contractor of his responsibility to turn over the same in good working order for its intended purpose at the completion of the Work In complete accordance with the Contract Documents. Any equipment, apparatus and/or device not fulfilling these requirements shall be removed and replaced by proper and acceptable equipment, etc., or put in good working order satisfactory to the Owner without additional cost to the Owner.

4.6 *WARRANTY*

- 4.6.1 The Contractor warrants to the Owner that all materials and equipment furnished under this Contract will be new unless otherwise specified, and that all workmanship will be of first class quality, free from faults and defects and in conformance with the Contract Documents and all other warranties and guaranties specified therein. Where no standard is specified for such workmanship or materials, they shall be the best of their respective kinds. All Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective.

If required by the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. This warranty is not limited by the provisions of Article 13, Uncovering and Correction of Work.

- 4.6.2 The Work included in this Contract is heretofore specified. The Contractor shall be required to complete the Work specified and to provide all items needed for construction of the project, complete and in good order.

4.7 *CONTRACTOR-PAID TAXES, PERMITS, FEES AND NOTICES*

- 4.7.1 The Contractor shall pay all sales, consumer, use and other similar taxes for the Work or portions thereof provided by the Contractor which are legally enacted at the time bids are received, whether or not yet effective. Taxes to be paid by the Contractor shall include, but shall not be limited to, the Lynchburg City Business, Professional and Occupational License Tax (a gross receipts tax).
- 4.7.2 Except as provided in Article 3.3 Owner-Paid Permits and Fees the Contractor will be responsible for obtaining and paying for all other fees, permits and licenses necessary for the proper execution of the work, including but not limited to:
- .1 Building Permit and inspections (City fees waived);
 - .2 Plumbing, Electrical, Mechanical Permits and inspections (City fees waived);
 - .3 Temporary water meter, temporary electrical and C&P installations and temporary utility usage;

- .4 Temporary security lighting;
- .5 All other permits necessary in order to perform the Work shall be secured by the Contractor and fees necessary in order to perform the Work shall be paid by him as part of this Contract at no additional cost to the Owner.

4.7.3 The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations, permits, resolutions and lawful orders of any public authority bearing on the performance of the Work; including but not limited to OSHA, Title 40.1 Labor and Employment Chapter 3 of the Code of Virginia, and Title VII of the Civil Rights Act of 1964, as amended. All safety violations shall be corrected immediately upon receipt of notice of violation.

4.8 COMPLIANCE

4.8.1 All demolition and excavation shall comply with the rules and regulations for the prevention of accidents as issued by the Department of Labor and Industry of the Commonwealth of Virginia.

4.8.2 To the extent of the work indicated in the Contract Documents, the Contractor shall comply and the construction shall conform with all applicable and current editions or revisions of the following codes, specifications and standards. In case of conflict, the order of precedence shall be as hereinafter listed:

- .1 Contract Documents;
- .2 Lynchburg City Purchasing Ordinance, as amended;
- .3 The Virginia Uniform Statewide Building Code, as amended (BOCA and NEC);
- .4 The Virginia Department of Transportation Road and Bridge Specifications and the Road Designs and Standards.

4.8.3 If the Contractor (or any person in contract with the Contractor relating to the subject project) finds an error, inconsistency, omission, ambiguity, discrepancy, conflict or variance in the Contract Documents, or between the Contract Documents and any of the codes, specifications and standards set forth in 4.8.2 herein, the Contractor has the obligation to seek a clarification thereof from the A/E, with a copy to the Owner, prior to the time the Work is performed which is affected by such error, inconsistency, omission, ambiguity, discrepancy, conflict or variance. The Owner will welcome such a clarification request and, if deemed necessary by the Owner, the Owner will issue a written instruction clarifying the matter in question. If the Contractor feels that the written clarification requires additional Work, the Contractor shall follow the change process in Article 12 Changes and Modifications in the Work.

Should the Contractor fail to seek such a clarification thereof immediately upon the discovery of the need therefor, prior to the time the said Work is performed, the Contractor thereby assumes all risk of loss related to such error, inconsistency, ambiguity, discrepancy, conflict or variance which the Contractor (and any person in contract with Contractor relating to the subject project) knew or should have known, using a normal, professional standard of care, existed prior to the time the Work was performed.

4.8.4 Any material or operation specified by reference to publications, published specifications of a Manufacturer, a Society, an Association, a Code, or other published Standard, shall comply with the requirements of the referenced document which is current on the date of receipt of bids. If the Contractor observes that any of the Contract Documents are at variance therewith in any respect, he shall promptly notify the A/E in writing, with a copy to the Owner. The A/E will make such judgements as are necessary and notify the Contractor prior to the performance of the work.

- 4.8.5 If the Contractor performs any Work contrary to such laws, ordinances, permits, rules, regulations and resolutions, he shall assume full responsibility therefor and shall bear all costs attributable thereto.
- 4.8.6 The Contractor will be held responsible for locating all underground structures such as water, oil and gas mains, water and gas services, storm and sanitary sewers and telephone and electric conduits which may be encountered during the construction operation. The Contractor shall have Miss Utility locate all utilities on the site which are within the area of the work and shall dig test holes to determine the position of the underground structures. The Contractor shall pay the cost of digging test holes and likewise he shall pay the cost of the services of the representatives of the owners of such utilities for locating the said utilities. The cost of determining the location of any and all utilities is to be included in the bid price. The Owner shall pay the owners of such utilities for fees or charges for relocation of gas, electric, telephone, cable or other lines and/or services indicated to be relocated by others.
- 4.8.7 If utilities are marked which are not shown on the plans, the Contractor shall immediately notify the Owner and the A/E of such finding. The Owner and A/E shall provide a direction to the Contractor within a reasonable period of time if additional work is required as a result of the finding.. If the Contractor believes that it requires additional Work, the Contractor shall follow the change process in Article 12 Changes and Modifications in the Work.

4.9 ALLOWANCES

- 4.9.1 The Special Conditions will contain provisions for allowances, if such is applicable to this Contract. (NA)

4.10 SUPERINTENDENT

- 4.10.1 The Contractor shall employ a competent Superintendent and any necessary assistants to ensure supervisory attendance at the Project site during the progress of the Work. The Superintendent shall have full authority to represent the Contractor and all communications given to the Superintendent shall be as binding as if given to the Contractor.
- 4.10.2 It is understood that such Superintendent shall be acceptable to the Owner and shall be one who will be continued in that capacity for duration of this project, unless he ceases to be on the Contractor's payroll. The Superintendent shall not be employed on any other project during the performance of this Contract.

4.11 CONSTRUCTION SCHEDULE

- 4.11.1 The Contractor shall within twenty (20) days after issuance of the Notice of Award, prepare and submit to the A/E and Owner for review, a reasonably practicable and feasible Construction Schedule and provide to Owners A/E with copy to the Owner, showing the method by which the Contractor will comply with Completion date requirements as set forth in the Construction Agreement. The schedule shall show in detail how the Contractor plans to execute and coordinate the Work. The Contractor shall use this schedule in the planning, scheduling, direction, coordination and execution of the Work. The Construction Schedule shall encompass all of the work of all trades necessary for construction of the project and shall be sufficiently complete and comprehensive to enable progress to be monitored on a day-to-day basis. The Owner and A/E shall each be provided with a copy of all schedules, updates reports and other documentation required herein which shall be suitable for reproduction by the Owner.
- 4.11.2 It is the sole responsibility of the Contractor to prepare, maintain, update, revise and utilize the Construction Schedule as outlined in 4.11 Construction Schedule. The schedule shall be the sole overall Construction Schedule utilized by the Contractor in managing this project, provided,

however, that Contractor may at its option employ and utilize other schedules based upon and consistent with the Construction Schedule. In general, it is the intent of this Paragraph to allow the Contractor to choose its own means, methods and construction procedures consistent with good practice and the Contract Documents.

- 4.11.3 If the Contractor should submit a schedule or express an intention to complete the Work earlier than any required Milestone or Completion date, the Owner shall not be liable to the Contractor for any costs or delay should the Contractor be unable to complete the Work before such earlier Milestone or Completion date. The duties, obligations and warranties of the Owner to the Contractor shall be consistent with and applicable only to the completion of the Work on the Milestone and completion dates required in the Construction Agreement.
- 4.11.4 Submission to the Owner of the Construction Schedule is advisory only and shall not relieve the Contractor of the responsibility for accomplishing the Work within each and every required Milestone and Completion date. Omissions and errors in the approved Construction Schedule shall not excuse performance that is not in compliance with the Contract. Submission to the Owner in no way makes the Owner an insurer of the Construction Schedule's success or liable for time or cost overruns flowing from its shortcomings. The Owner hereby disclaims any obligation or liability by reason of Owner approval or failure to object to the Construction Schedule.
- 4.11.5 Contractor shall consult with and obtain information from principal Subcontractors necessary in preparation of the schedules, updates and revisions required herein. Contractor shall provide each principal Subcontractor with copies of the Construction Schedule and any revisions or updates affecting a Subcontractor's work. Contractor shall hold appropriate progress meetings with Subcontractors and shall direct and coordinate the work of Subcontractors consistent with and as required herein. Owner shall have the right to attend Subcontractor progress meetings but shall not be required to participate in such meetings or provide information to Subcontractors, except through the Contractor. Contractor shall keep up-to-date minutes of Subcontractor progress meetings and shall provide same to Owner. The Contractor shall ensure that each Subcontractor, Sub-subcontractor or supplier acknowledges and accepts the requirements of the Construction Schedule relating to their part of the Work.
- 4.11.6 If Contractor's Construction Schedule indicates that Owner or a separate Contractor is to perform an activity by a specific date, or within a certain duration, Owner or any separate Contractor shall not be bound to said date or duration unless Owner expressly and specifically agrees in writing to same; the Owner's overall review of the schedule does not constitute an agreement to specific dates or durations for activities of the Owner or any separate contractor.
- 4.11.7 The Contractor's Superintendent shall maintain at the job site, a current Construction Schedule, indicating actual monthly progress for those portions of the project on which work has been or is being performed.
- 4.11.8 If an extension or contraction of any Milestone or Completion Date is authorized by any Change Order, the Contractor shall revise his Construction Schedule, Milestone and Completion Dates accordingly.
- 4.11.9 If, in the opinion of the Owner, the Construction Schedule does not accurately reflect the actual progress and sequence of the Contractor's performance of the Work, the Contractor shall revise the Construction Schedule, upon the Owner's request, and submit a revised Construction Schedule that accurately represents the progress and sequence of the Contractor's performance of the Work.
- 4.11.10 Contractor shall submit to the Owner the name of any scheduling consultant that Contractor may select or retain. Contractor shall not utilize any particular scheduling consultant over the reasonable objection of the Owner to that consultant.

4.11.11 Contractor covenants and guarantees that Contractor will not:

- .1 Misrepresent to Owner its planning and scheduling of the Work;
- .2 Utilize schedules materially different from those made available to the Owner or any Subcontractors for the direction, execution and coordination of the Work, or which are not feasible or realistic;
- .3 Prepare schedules, updates, revisions or reports which do not accurately reflect Contractor's actual intent or Contractor's reasonable and actual expectations as to:
 - (a) The sequences of activities,
 - (b) The duration of activities,
 - (c) The responsibility for activities,
 - (d) Resource availability,
 - (e) Labor availability or efficiency,
 - (f) Expected weather conditions,
 - (g) The value associated with the activity,
 - (h) The percentage complete of any activity,
 - (i) Completion of any item of work or activity,
 - (j) Project completion,
 - (k) Delays, slippages, or problems encountered or expected,
 - (l) Subcontractor requests for time extension, or delay claims of subcontractors, and
 - (m) If applicable, the float time available.

4.11.12 Contractor's failure to substantially comply with the foregoing covenant and guarantee of Paragraph 4.11.11 shall be a substantial and material breach of contract which will permit Owner to terminate Contractor for default, or withhold payments under the Contract Documents, and shall entitle Owner to the damages afforded for misrepresentation or fraud by these Contract Documents or applicable law.

4.11.13 Should Contractor fail to substantially comply with the provisions of the Contract Documents relating to scheduling and execution of the Work by the overall project schedule, Owner shall have the right, at its option, to retain the services of scheduling consultants or experts (including attorneys if necessary in the opinion of the Owner) to prepare schedules, reports, updates and revisions of the schedule in accordance with the Contract Documents and to review and analyze same, in order to allow Owner and A/E to evaluate the program of the Work by Contractor, to determine whether Contractor is substantially complying with the Contract Documents, and to direct such action of the part of the Contractor, as permitted by the Contract Documents, as required to ensure, under the Owner's schedule prepared hereunder, that Contractor will complete the Work within the Contract Time. All costs and expenses and fees incurred by Owner in preparing the schedule hereunder shall be charged to Contractor's account. If Contractor fails to substantially comply with the scheduling and execution of the work requirements of the Contract Documents, Contractor hereby agrees, in such instance, to comply with such Owner-prepared schedules, if any, or directions, and activity sequences and durations as Owner may reasonably

require, without additional cost to the Owner (subject only to cost adjustments for such changes in the Work as Owner may direct), to ensure completion within the Contract Time.

4.11.14 The Construction Schedule shall be utilized by Owner, A/E and Contractor for submission, review and approval of monthly Payment Request. The schedule must be updated by Contractor monthly with each progress payment application and submitted to the Owner and A/E for review with the progress payment application. Owner shall not be required to process and review Contractor's Application for Payment if Contractor has failed or refused to provide the scheduling update information required herein.

4.11.15 The type of schedule to be utilized on this project, along with its particular elements, shall be as specified herein.

4.12 RESPONSIBILITY FOR COMPLETION

4.12.1 The Contractor shall furnish such manpower, materials, facilities and equipment and shall work such hours, including night shifts, overtime operations and Sundays and holidays, as may be necessary to ensure the performance of the Work within the Milestone and Completion dates specified in the Construction Agreement. If the Owner notifies the Contractor that it has become apparent that the Work will not be Completed within required Milestone or Completion dates, the Contractor agrees that it will assume full responsibility to take some or all of the following actions, at no additional cost to the Owner (except for circumstances beyond the Contractors' control), in order to ensure, in the opinion of the Owner, that the Contractor will comply with all Milestone and Completion date requirements:

- .1 Increase manpower, materials, crafts, equipment and facilities;
- .2 Increase the number of working hours per shift, shifts per working day, working days per week, or any combination of the foregoing; and
- .3 Reschedule activities to achieve maximum practical concurrency of accomplishment of activities.

Failure of the Owner to notify the Contractor of the apparent delay shall not relieve Contractor of the obligation to finish the project within the required Milestone or Completion date.

4.12.2 If the actions taken by the Contractor are not satisfactory, the Owner may direct the Contractor to take any and all actions necessary to ensure completion within the required Milestone and Completion dates, without additional cost to the Owner (except for circumstances beyond the Contractor's control) . In such event, the Contractor shall continue to assume responsibility for his performance and for completion within the required dates.

4.12.3 If, in the opinion of the Owner, the actions taken by the Contractor pursuant to this Article or the progress or sequence of Work are not accurately reflected on the Construction Schedule, the Contractor shall revise such schedule to accurately reflect the actual progress and sequence of Work.

4.12.4 Failure of the Contractor to substantially comply with the requirements of this Article is grounds for a determination by the Owner, pursuant to Article 15 TERMINATION OF THE CONTRACT, that the Contractor is failing to prosecute the Work with such diligence as will ensure its completion within the time specified.

4.12.5 The Owner may, at its sole discretion and for any reason, including when it is apparent to the A/E or Owner that the Work will be completed within the required Milestone or Completion dates, require the Contractor to accelerate the Schedule of Performance by providing overtime, Saturday, Sunday and/or holiday work and/or by having all or any Subcontractors designated by

the Owner provide overtime, Saturday, Sunday, and/or holiday work. In the event that the Owner requires overtime, Saturday, Sunday or holiday work by the Contractor's or his Subcontractor's own forces, and such requirement is not related in any way to the Contractor's apparent inability to comply with Milestone and Completion date requirements, the Owner shall reimburse the Contractor for the direct cost to the Contractor of the premium time for all labor utilized by the Contractor in such overtime, Saturday, Sunday or holiday work (but not for the straight time costs of such labor), together with any Social Security and State or Federal unemployment insurance taxes in connection with such premium time. However, no overhead supervision costs, commissions, profit or other costs and expenses shall be payable in connection therewith.

- 4.12.6 This provision does not eliminate the Contractor's responsibility to comply with the City's noise ordinances, all VDOT permit requirements and all other applicable laws, regulations, rules, ordinances, resolutions, and permit requirements.

4.13 DOCUMENTS AND SAMPLES AT THE SITE

- 4.13.1 The Contractor shall, at the Owner's direction, maintain at the site for the Owner one record copy of all Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record all changes made during construction, and approved Shop Drawings, Product Data, Samples and Manuals. These shall be available to the A/E. These shall be delivered to the Owner upon completion of the Work.

4.14 SHOP DRAWINGS, PRODUCT DATA, SAMPLES AND MANUALS

- 4.14.1 SHOP DRAWINGS are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or any Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.
- 4.14.2 PRODUCT DATA are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product or system for some portion of the Work.
- 4.14.3 SAMPLES are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.
- 4.14.4 MANUALS are manufacturer's installation, start-up, operating, maintenance and repair instructions, together with parts lists, pictures, sketches and diagrams that set forth the manufacturer's requirements, for the benefit of the Contractor and the Owner.
- 4.14.5 The Contractor shall review, approve and submit, with reasonable promptness and in such sequence as to cause no delay in the Work or in the Work of the Owner or any separate contractor, all Shop Drawings, Product Data, Samples and Manuals required by the Contract Documents.
- 4.14.6 By approving and submitting Shop Drawings, Product Data, Samples and Manuals, the Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

Parts and details not fully indicated on the contract drawings shall be detailed by the Contractor in accordance with standard engineering practice. Dimensions on the contract drawings, as well as detailed drawings themselves are subject in every case to measurements of existing, adjacent, incorporated and completed work, which shall be taken by the Contractor before undertaking any work dependent on such data.

- 4.14.7 The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Owner or A/E's approval of Shop Drawings, Product Data, Samples or Manuals under Article 2 Architect/Engineer unless the Contractor has specifically informed the Owner and A/E in writing of such deviation at the time of submission and the Owner has given written approval to the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data, Samples or Manuals by the A/E's approval thereof.
- 4.14.8 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data or Samples, to revisions other than those requested by the Owner or A/E on previous submittals.
- No portion of the Work requiring submission of Shop Drawings, Product Data, or Samples shall commence until the submittal has been approved by the Owner and A/E as provided in Article 2 Architect/Engineer. All such portions of the Work shall be in accordance with approved submittals.
- 4.14.9 For substances that are proposed for use in the project that may be hazardous to human health, the Contractor shall submit to the A/E, for information only, information on precautions for safely using these substances, including certification of registration by the Contractor with authorities under the respective Virginia and Federal Toxic Substances Control Acts.
- 4.14.10 Unless otherwise modified by the Owner in writing, the Contractor shall label or stamp and number all Shop Drawings, Product Data, Samples or Manuals as prescribed by the project Manager.
- 4.14.11 The Contractor shall submit a copy of each submittal, including the transmittal sheet (for shop drawings, product data, samples or manuals) to the Owner simultaneously with the Contractor's submission of said drawings, data, samples or manual packages to the A/E.

4.15 EQUAL PRODUCTS:

- 4.15.1 The term "Product" as used herein refers to materials, equipment, supplies, articles, fixtures, devices, types of construction, or products, as appropriate.
- 4.15.2 All products furnished shall, whenever specified and otherwise wherever practicable, be the standard products of recognized, reputable manufacturers. If the manufacturer cannot make scheduled delivery of an approved item, the Contractor may request approval of the Owner to use another brand, make, manufacturer, article, device, product, material, fixture, form or type of construction which the Contractor judges to be equal to that specified. An item shall not be considered by the Owner for approval as equal to the item so named or described unless it (1) it is at least equal in quality, durability, appearance, strength, and design; (2) it will perform at least equally the specific function imposed by the general design for the work being contracted for or the material being purchased; and (3) it conforms substantially, even with deviations, to the detailed requirements for the item in the specifications. Approval shall be at the sole discretion of the Owner and will be based upon considerations of quality, workmanship, economy of operation, suitability for the purpose intended, and acceptability for use on the project. Any such approval must be in writing to be effective and the decision of the Owner shall be final.
- 4.15.4 To obtain such approval of equal products other than those specified in Contract Documents, and not previously approved during the bidding, the Contractor's request for approval of any equal product shall include the following:
- .1 Complete data substantiating compliance of the proposed equal product with the Contract Documents;

- .2 Accurate cost data on proposed equal product in comparison with product or method specified;
- .3 Product identification including manufacturer's name, address, and phone number;
- .4 Manufacturer's literature showing complete product description, performance and test data, and all reference standards;
- .5 Samples and colors in the case of articles or products;
- .6 Name and address of similar projects on which the product was used and date of installation;
- .7 All directions, specifications, and recommendations by manufacturers for installation, handling, storing, adjustment, and operation.

4.15.5 The Contractor shall also submit with his request for approval a statement which shall include all of the following representations by the Contractor, namely that:

- .1 He has investigated the proposed equal product and determined that it is equal or better in all respects to that specified and that it fully complies with all requirements of the Contract Documents;
- .2 He will meet all contract obligations with regard to this substitution;
- .3 He will coordinate installation of accepted equal products into the work, making all such changes and any required schedule adjustments, at no additional cost to the Owner, as may be required for the Work to be complete in all respects;
- .4 He waives all claims for additional costs and additional time related to equal products. He also agrees to hold the Owner harmless from claims for extra costs and time incurred by Subcontractors and suppliers, or additional services which may have to be performed by the A/E, for changes or extra work that may, at some later date, be determined to be necessary in order for the Work to function in the manner intended in the Contract Documents;
- .5 He will provide the same warranty and guarantee, and perform any work required in accordance therewith, for the equal product that is applicable to the specified item for which the equal product is requested;
- .6 Material will be installed, handled, stored, adjusted, tested, and operated in accordance with the manufacturers' recommendation and as specified in the Contract Documents;
- .7 In all cases new materials will be used unless this provision is waived by Notice from the Owner or unless otherwise specified in the Contract Documents;
- .8 All material and workmanship will be in every respect, in accordance with that which in the opinion of the Owner, is in conformity with approved modern practice; and
- .9 He has provided accurate cost data on the proposed equal product in comparison with the product or method specified, if applicable.

4.15.6 The Owner may require tests of all products proposed as equal products so submitted to establish quality standards, at the Contractor's expense. After approval of an equal product, if it is determined that the Contractor submitted defective information or data regarding the equal product upon which Owner's approval was based, and that unexpected or unanticipated redesign or rework of the project will be required in order to accommodate the equal product, or that the item will not perform or function as well as the specified item for which equal product

was requested, the Contractor will be required to furnish the original specified item or request approval to use another equal product. The Contractor shall pay all costs, expenses or damages associated with or related to the unacceptability of such an equal product and the resultant utilization of another item and no time extension shall be granted for any delays associated with or related to such an equal product.

4.15.7 Equal products will not be considered for approval by the Owner if:

- .1 The proposed equal product is indicated or implied on the Contractor's shop drawing or product data submittals and has not been formally submitted for approval by the Contractor in accordance with the above-stated requirements; or
- .2 Acceptance of the proposed equal product will require substantial design revisions to the Contract Documents or is otherwise not acceptable to the Owner.

4.15.8 Except as otherwise provided for by the provisions of any applicable laws, the Contractor shall not have any right of appeal from the decision of the Owner disapproving any products submitted if the Contractor fails to obtain the approval for an equal product under this Article.

4.15.8 If the Contractor proposes a product which the Owner determines is not equal to the product named in Contract Documents but which the Owner nevertheless is willing to accept, Contractor shall provide upon request by the Owner an itemized comparison of the proposed substitution with the product specified and the cost differential which shall be credited to the Owner in a Change Order issued in accordance with Article 12 Changes and Modifications in the Work.

4.16 USE OF SITE

4.16.1 The Contractor shall confine his operations at the site to areas permitted by law, ordinances, permits, easements, right-of-way agreements and the Contract Documents. The Contractor shall not unreasonably encumber the site, in the opinion of the Owner, with any materials, equipment or trailers nor shall he block the entrances or otherwise prevent reasonable access to the site, other working and parking areas, completed portions of the Work and/or properties, storage areas, areas of other facilities that are adjacent to the worksite. If the Contractor fails or refuses to move said material, equipment or trailers within 24 hours of Notice by the Owner to so do, the Owner shall have the right, without further Notice, to remove, at the Contractor's expense, any material, equipment and/or trailers which the Owner deems are in violation of this paragraph.

4.17 CUTTING AND PATCHING OF WORK

4.17.1 The Contractor shall be responsible for all cutting, fitting or patching that may be required to complete the Work and to make its several parts fit properly and in accordance with the Contract Documents.

4.17.2 The Contractor shall not damage or endanger any portion of the Work or the work of the Owner or any separate contractors by cutting, patching or otherwise altering any work, or by excavation. The Contractor shall not cut or otherwise alter the work of the Owner or any separate contractor except with the written consent of the Owner and of such separate contractor. The Contractor shall not unreasonably withhold from the Owner or any separate contractor his consent to cutting or otherwise altering the Work. The Owner shall not be required to accept Work with a cut, splice, or patch when such cut, splice or patch is not generally accepted practice for the particular work involved or is otherwise unworkmanlike in the opinion of the Owner.

4.18 RIGHT TO PUBLISH

- 4.18.1 The Contractor agrees that he will not publish, cause to be published, or otherwise disseminate any information of whatever nature relating to the Work being performed under this Contract, except as may be approved by the Owner in writing.

4.19 SITE CLEAN UP

- 4.19.1 The Contractor at all times shall keep the Project site and adjacent areas free from accumulation of waste materials or rubbish caused by his operations. Before final payment is made, the Contractor shall remove all of his waste materials, rubbish, scrap materials, debris, tools, construction equipment, machinery, surplus materials, falsework, temporary structures, including foundations thereof and plant of any description, from the Project site and put the site in a neat, orderly condition.
- 4.19.2 If the Contractor fails to clean up as required herein at any time during the performance of the Work or at the completion of the Work, the Owner may, upon 24 hours notification, clean up the site at the Contractor's expense.

4.20 PATENTS, ROYALTIES, ETC.

- 4.20.1 The Contractor guarantees to save harmless the Owner, its officers, agents, servants and employees from liability of any kind or nature, including cost, expense and attorney's fees on account of suits and claims of any kind for violation or infringement of any patents or patent rights by the Contractor, or by anyone directly or indirectly employed by him, or by reason of the use of any art, process, method, machine, manufacture, or composition of matter patented or unpatented in the performance of this Contract in violation or infringement of any letter or rights. The Contractor agrees to pay all royalties, fees, licenses, etc. required in respect of the work or any part thereof as part of his obligations hereunder without any additional compensation.

4.21 INDEMNIFICATION

- 4.21.1 It is hereby mutually covenanted and agreed that the relation of the Contractor to the work to be performed by him under this Contract shall be that of an independent contractor and that as such he will be responsible for all damages, loss or injury, including death, to persons or property that may arise or be incurred in or during the conduct and progress of said work as the result of any action, omission or operation under the Contract or in connection with the Work, whether such action, omission or operation is attributable to the Contractor, Subcontractor, any material supplier, or anyone directly or indirectly employed by any of them. The Contractor shall make good any damages that may occur in consequence of the Work or any part of it. The Contractor shall assume all liability, loss and responsibility of whatsoever nature by reason of his neglect or violation of any Federal, State, County or local laws, regulations or ordinances.
- 4.21.2 The Contractor shall indemnify, hold harmless and defend the Owner, its employees, agents, servants and representatives from and against any and all claims, suits, demands, actions (regardless of the merits thereof) and damages of whatever nature arising out of or resulting from the performance of the Work or the failure to perform the Work, including jurisdictional labor disputes or other labor troubles that may occur during the performance of the Work.
- 4.21.3 The indemnification obligations under this Article shall not be affected in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under worker's or workman's compensation acts, disability benefit acts or other employee benefit acts.

- 4.21.4 The obligations of the Contractor under this Article 4.21 shall not extend to the actions or omissions of the A/E, his agents or employees, arising out of; (1) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications, or (2) the giving of or the failure to give directions or instructions by the A/E, his agents or employees provided such giving or failure to give is the primary cause of the injury or damage.
- 4.21.5 The obligations of the Contractor under this Article 4.21 shall not extend to the proportion of damages, loss or injury, including death, to persons or property that may arise or be incurred as the result of any action, omission or operation of the Owner, or Owner's Separate Contractor(s), and their employees, agents, servants, and/or representatives.

4.22 NON-DISCRIMINATION IN EMPLOYMENT

4.22.1 During the performance of this Contract, the Contractor agrees as follows:

- .1 The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age or disability, or any other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause;
- .2 The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal opportunity employer;
- .3 Notices, advertisements and solicitations placed in accordance with Federal Law, rule or regulation, shall be deemed sufficient for the purpose of meeting the requirements of this provision; and
- .4 The Contractor will include the provisions of paragraphs .1, .2 and .3 above in every subcontract or purchase order of over \$10,000 so that the provisions will be binding upon every Subcontractor or vendor.

4.23 CONTRACT SECURITY

- 4.23.1 The Contractor shall deliver to the Owner, within ten (10) working days from Notice of Award, two (2) originals of a Performance Bond and a separate Labor and Material Payment Bond in a form acceptable to the Owner and each in an amount required by the Contract Documents as security for the faithful performance of the Contract, and the payment of all persons performing labor and furnishing materials in connection with this Contract. The City will not issue Notice to Proceed until the bonds are received. The amount of the Performance and Payment Bonds shall be increased to the same extent the Contract Sum is increased due to modifications. The form of bonds shall be acceptable to the Owner and the surety shall be such surety company or companies as are acceptable to the Owner and as are authorized to transact business in the Commonwealth of Virginia. The cost of such bonds shall be included in the Contractor's proposal amount.
- 4.23.3 The Contractor shall require that all sureties providing bonds for the Project will give written Notice to the Owner, at least thirty (30) days prior to the expiration or termination of the bond(s).
- 4.23.4 If, at any time, any surety or sureties becomes insolvent or is determined by the Owner to be unable to adequately secure the interest of the Owner, the Contractor shall within (30) days after Notice from the Owner to do so, substitute an acceptable bond(s) in such form and sum and signed by such other sureties as may be satisfactory to the Owner. The premiums on such bond(s) shall be paid by the Contractor.

ARTICLE 5 SUBCONTRACTORS

5.1 DEFINITIONS

- 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform or supply any of the Work at the site. The term Subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Subcontractor or his authorized representative. The term Subcontractor does not include any separate contractor or his Subcontractors.
- 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform or supply any of the Work at the site. The term Sub-subcontractor is referred to throughout the Contractor Documents as if singular in number and masculine in gender and means a Sub-subcontractor or an authorized representative thereof.
- 5.1.3 The A/E will not deal directly with any Subcontractor or Sub-subcontractor or materials supplier. Subcontractor, Sub-subcontractors or material suppliers shall route requests for information or clarification through the Contractor to the A/E, with a copy to the Owner.

5.2 AWARD OF SUBCONTRACT AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

- 5.2.1 The Contractor shall submit to the Owner with a copy to the A/E prior to the award of any subcontract for work under this contract and thirty (30) calendar days after the award of this contract, the names of the suppliers of principal items, systems, materials, and equipment proposed for the Work; the names and addresses, business and emergency phones of the Subcontractors which he proposes to employ under this contract, as well as such other information as may be requested by the Owner. The Owner will review each Subcontractor and supplier based upon his apparent financial soundness and responsibility, his known or reported performance on previous similar work, and his available plant, equipment and personnel to perform the Work. The Contractor shall not employ a Subcontractor or supplier to whom the Owner reasonably objects. The Owner's objection to a proposed Subcontractor or supplier shall not affect the contract price.
- 5.2.2 The Contractor shall make no substitutions for any Subcontractor, person or entity previously selected unless first submitted to the City for review.

5.3 SUBCONTRACTUAL RELATIONS

- 5.3.1 By an appropriate written agreement the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these Documents assumes toward the Owner and the A/E. Said agreement shall preserve and protect the rights of the Owner and the A/E under the Contract Documents with respect to the Work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the Contractor-Subcontractor agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with his Sub-subcontractor's. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract, copies of all of the Contract Documents, and identify to the Subcontractor any terms and conditions of the proposed subcontract which may be at variance with the Contract Documents. Each Subcontractor shall

similarly make copies of such Documents available to his Sub-subcontractor's. Each subcontract agreement shall insure that all appropriate provisions of the Contract Documents are complied with by the Subcontractor.

- 5.3.2 The provisions herein regarding the City's reasonable objection to any Subcontractor shall in no way affect the liability of the Contractor to Owner regarding performance of all obligations by or payment of Subcontractors. The City's failure to object to any given Subcontractor shall not relieve the Contractor of his obligation to perform or have performed to the full satisfaction of the Owner all of the work required by this Contract.
- 5.3.3 Neither this article nor any other provision of the contract documents shall be deemed to make the Owner a joint venturer or partner with the Contractor or to place the Subcontractor and materialmen in privity of contract with the Owner.

5.4 QUALIFICATION SUBMITTALS

- 5.4.1 Specific qualification submittals may be required of the Contractor, Subcontractors, installers and suppliers for certain critical items of the Work. Required qualification submittals are set forth in detail in the Instruction to Bidders and shall be provided, collected and submitted by the Contractor to the A/E with copies to the Owner. All information required of a single Subcontractor, installer or supplier shall be contained in a single, complete submittal. The Contractor shall submit the required qualification information within ten (10) days after receipt of the Owner's request.
- 5.4.2 The Owner shall reject any proposed Subcontractor, installer or supplier, or any qualification submittals related thereto, for the following reasons:
 - .1 The Contractor's failure to submit requested information within the specified time; or
 - .2 The Contractor's failure to provide all of the requested information; or
 - .3 The Contractor's submission of a Subcontractor, installer or supplier, or qualifications thereof, which are unacceptable in the judgment of the Owner.
- 5.4.3 Should the Owner have reasonable objection to any proposed Subcontractor, installer or supplier, the Contractor shall submit another firm for approval by the Owner at no additional cost to the Owner.

ARTICLE 6 WORK BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM WORK AND TO AWARD SEPARATE CONTRACTS

- 6.1.1 The Owner reserves the right to perform work related to the Project with his own forces, and to award separate contracts in connection with other portions of the Project or other work on the site.
- 6.1.2 When separate contracts are awarded for different portions of the Project or other work on the site, the term Contractor in the Contract Documents in each case shall mean the Contractor who executes each separate Construction Agreement.

6.2 MUTUAL RESPONSIBILITY

- 6.2.1 The Contractor shall afford other contractors and the Owner reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work and shall properly connect and coordinate the Work with such other work. The Contractor shall

coordinate his Work with the Owners and other contractors to store his apparatus, materials, supplies and equipment in such orderly fashion at the site of the Work as will not unduly interfere with the progress of the Work or the work of any other contractors.

- 6.2.1.1 If the execution or result of any part of the Work depends upon any work of the Owner or of any separate contractor, the Contractor shall, prior to proceeding with the Work, inspect and promptly report to the Owner in writing any apparent discrepancies or defects in such work of the Owner or of any separate contractor that render it unsuitable for the proper execution or result of any part of the Work.
- 6.2.1.2 Failure of the Contractor to so inspect and report shall constitute an acceptance of the Owner's or separate contractor's work as fit and proper to receive the Work, except as to defects which may develop in the Owner's or separate contractor's work after completion of the Work and which the Contractor could not have discovered by its inspection prior to completion of the Work.
- 6.2.2 Should the Contractor cause damage to the work or property of the Owner or of any separate contractor on the Project, or to other work on the Site, or delay or interfere with the Owner's work on ongoing operations or facilities or adjacent facilities or said separate contractor's work, the Contractor shall be liable for the same; and, in the case of another contractor, the Contractor shall attempt to settle said claim with such other contractor prior to such other contractor's institution of litigation or other proceedings against the Contractor.

If such separate contractor sues the Owner on account of any damage, delay or interference caused or alleged to have been so caused by the Contractor, the Owner shall notify the Contractor, who shall defend the Owner in such proceedings at the Contractor's expense. If any judgment or award is entered against the Owner, the Contractor shall satisfy the same and shall reimburse the Owner for all damages, expenses, and other costs that the Owner incurs as a result thereof.

- 6.2.3 Should Contractor have a dispute with a separate contractor with whom the Owner has contracted regarding damage to the Work or the property of Contractor or to the Work or property of said separate contractor or with regard to any delays or interferences which either Contractor or said separate contractor has caused to the performance of the other's Work, Contractor agrees to attempt to settle such dispute directly with said separate contractor. Contractor agrees that it will not seek to recover from the Owner any damages, costs, expenses (including, but not limited to, attorney's fees) or losses of profit incurred by the Contractor as a result of any damage to the Work or property of the Contractor or for any delay or interference caused or allegedly caused by any separate contractor.

6.3 *OWNER'S RIGHT TO CLEAN UP*

- 6.3.1 If a dispute arises between the Contractor and separate contractors as to their responsibility for cleaning up as required by Article 4 Contractor, the Owner may clean up and charge the cost thereof to the Contractor responsible therefore as the Owner shall determine to be just.

ARTICLE 7 MISCELLANEOUS PROVISIONS

7.1 *GOVERNING LAW*

The provisions of this contract shall be interpreted in accordance with the laws, ordinances, regulations, permits and resolutions of the Commonwealth of Virginia, The City of Lynchburg, and any applicable municipality.

7.2 PROVISIONS REQUIRED BY LAW DEEMED INSERTED

Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein and if through mistake or otherwise, any such provision is not inserted or is not correctly inserted, then upon the application of either party, the Contract shall forthwith be physically amended to make such insertion.

7.3 SUCCESSORS AND ASSIGNS

The Owner and the Contractor each binds himself, his partners, successors, assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party in respect to all covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any monies due or to become due to him hereunder, without the previous written consent of the Owner and the Contractor's Surety.

In the event the Contractor desires to make an assignment of all or part of the Contract or any monies due or to become due hereunder, the Contractor shall file a copy of consent of surety, together with a copy of the assignment to the Owner and A/E. In the event the Contractor assigns all or any part of the monies due or to become due under this Contract, the instrument of assignment shall state that the right of assignees in and to any monies due to or to become due to Contractor shall be subject to prior liens and claims of all persons, firms and corporations that provided labor services or furnished material and equipment during the performance of the Work. The rights of assignees shall further be subject to the payment of any liens, claims, or amounts due to Federal, State, or Local governments.

7.4 RIGHTS AND REMEDIES

- 7.4.1 The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law, not inconsistent with the Contract Documents. No time limitations described in this Contract shall be construed to alter the applicable statutory period of limitations with regard to the enforcement of the obligations of the parties.
- 7.4.2 No action or failure to act by the Owner, A/E or Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.
- 7.4.3 Contractor agrees that he can be adequately compensated by money damages for any breach of this Contract which may be committed by the Owner and hereby agrees that, no default, act, or omission of the Owner or the Architect, except for failure to make payments as required by the Contract Documents, shall constitute a material breach of the Contract entitling Contractor to cancel or rescind the provisions of this Contract or (unless the Owner shall so consent or direct in writing) to suspend or abandon performance of all or any part of the Work. Contractor hereby waives any and all rights and remedies to which he might otherwise be or become entitled, saving only its right to money damages.

7.5 SEVERABILITY

In the event that any provision of this contract shall be adjudged or decreed to be invalid, such ruling shall not invalidate the entire agreement but shall pertain only to the provision in question and the remaining provisions shall continue to be valid, binding, and in full force and effect.

7.6 TESTS

- 7.6.1 If the Contract Documents, laws, ordinances, rules, regulations, permits, resolutions or orders of any public authority having jurisdiction require any portion of the Work to be inspected, tested or approved, the Contractor shall give the Owner at least 24 hours notice of its readiness so that the Owner or the A/E or other representatives of the Owner may observe such inspection, testing or approval. The Contractor shall bear all costs of such inspections, tests or approvals conducted by public authorities. Site inspections, tests conducted on site or tests of materials gathered on site, which the contract requires to be performed by independent testing entities, shall be contracted and paid for by the Contractor. Examples include, but are not limited to, the testing of cast-in-place concrete, foundation materials, soil compaction, pile installations, caisson bearings, and steel framing connections.
- 7.6.2 All materials and workmanship (if not otherwise designated by the specifications) shall be subject to inspection, examination or test by the Owner, A/E, and other representatives of the Owner, at any and all times during the manufacture and/or construction and at any and all places where such manufacture and/or construction are carried on. Special, full-sized and performance tests shall be as described in the specifications. Without additional charge, the Contractor shall furnish promptly all reasonable facilities, labor and materials necessary to make tests safe and convenient.
- 7.6.3 The selection of bureaus, laboratories and/or agencies for the inspection and tests of supplies, materials or equipment shall be subject to the approval of the Owner. Satisfactory documentary evidence, including but not limited to certificates of inspection and certified test reports, that the material has passed the required inspection and tests must be furnished to the Owner, with a copy to the A/E, by the Contractor prior to the incorporation of the materials in the Work or at such times as to allow for appropriate action by the Owner.
- 7.6.4 Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor. Tests required by Contractor's or Subcontractor's error, omission or non-compliance with the Contract Documents, shall be paid for by the Contractor.
- 7.6.5 It is specifically understood and agreed that an inspection and approval of the materials by the Owner shall not in any way subject the Owner to pay for the said materials or any portion thereof, even though incorporated in the Work, if said materials shall in fact turn out to be unfit to be used in the Work, nor shall such inspection be considered as any waiver of objection to the Work on account of the unsoundness or imperfection of the material used.

ARTICLE 8 CONTRACT TIME

8.1 DEFINITION

- 8.1.1 Unless otherwise provided, the Contract Time is the period of time specified in the Construction Agreement for Substantial Completion of the Work as defined herein, including authorized adjustments thereto. The Contractor shall complete his Work within the Contract Time.
- 8.1.2 The date of commencement of the Work is the date established in the Notice to Proceed
- The Contractor shall not commence work or store materials or equipment on site until written Notice to Proceed is issued or until the Contractor otherwise receives the Owner's written consent. The Contractor shall commence work no later than ten (10) days after the date established in the Notice to Proceed.
- 8.1.3 The date of Substantial Completion of the Work or designated portion thereof is the date determined by Owner when: (1) construction is sufficiently complete, in accordance with the

Contract Documents, so the Owner can occupy or utilize the Work or designated portion thereof for the use for which it is intended; and (2) the Contractor has satisfied all other requirements for Substantial Completion which may be set forth in the Contract Documents.

8.1.4 The date of Final Completion of the Work is the date determined by the Owner when the Work is totally complete, to include punch list work, in accordance with the Contract Documents and the Owner may fully occupy and utilize the Work for the use for which it is intended.

8.1.5 The term "day" as used in the Contract Documents shall mean calendar days unless otherwise specifically designated.

8.2 *PROGRESS AND COMPLETION*

8.2.1 All time limits stated in the Contract Documents are of the essence of the Contract.

8.2.2 The Contractor shall begin the Work on the date of commencement as defined herein. He shall carry the Work forward expeditiously with adequate forces and shall achieve Substantial and Final Completion as required by the Contract Documents.

8.3 *CLAIMS FOR TIME EXTENSIONS*

8.3.1 The time during which the Contractor is delayed in the performance of the Work by the acts or omissions of the Owner, the A/E or their employees or agents, acts of God, unusually severe and abnormal climatic conditions, fires, floods, epidemics, quarantine restrictions, strikes, riots, civil commotion or freight embargoes, or other conditions beyond the Contractor's control and which the Contractor could not reasonably have foreseen and provided against, shall be added to the time for completion of the Work (i.e., the Contract Time) stated in the Agreement; however, no claim by the Contractor for an extension of time for delays will be considered unless made in compliance with the requirements of this Article and other provisions of the Contract Documents.

8.3.2 The Owner shall not be obligated or liable to the Contractor for, and the Contractor hereby expressly waives any claims against the Owner on account of any indirect or direct damages, costs or expenses of any nature which the Contractor, its Subcontractors, or Sub-subcontractor's or any other person may incur as a result of (1) any delays, reasonable or unreasonable, foreseeable or unforeseeable which are either not caused by the acts or omissions of the Owner, its agents or employees or which arise from or out of (or due to) causes not within the control of the Owner, its agents or employees, or (2) any reasonable delay regardless of its cause, it being understood and agreed that the Contractor's sole and exclusive remedy in any such events shall be an extension of the Contract Time, but only as determined in accordance with the provisions of the Contract Documents.

8.3.3 The burden of proof to substantiate a claim for an extension of the Contract Time shall rest with the Contractor, including evidence that the cause was beyond his control. It shall be deemed that the Contractor has control over the supply of labor, materials, equipment, methods and techniques of construction and over the Subcontractors and suppliers, unless otherwise specified in the Contract Documents.

8.3.4 In the event of Changes in the Work, the Contractor must identify any additional time required in the Proposed Change Order. The Owner need not consider any time extensions for Changes in the Work not included in the Proposed Change Order.

8.3.5 No time extensions will be granted as a result of the Contractor's improper or unreasonable scheduling or for the Contractor's failure to have Shop Drawings, Product Data, Samples or Manuals submitted in ample time for review under a reasonable and agreed upon schedule.

- 8.3.6 Delays by Subcontractors or suppliers will not be considered justification for a time extension, except for the same valid reasons and conditions enumerated herein.
- 8.3.7 The Contractor acknowledges and agrees that actual delays due to changes, suspension of work or excusable delays, in activities which according to the schedule do not affect the Contract Time will not be considered to have any effect upon the Contract Time and therefore will not be the basis for a time extension.
- 8.3.8 The Contractor acknowledges and agrees that time extensions will be granted only to the extent that: (1) excusable delays exceed the available flexibility in the Contractor's schedule; and (2) Contractor can demonstrate that such excusable delay actually caused, or will cause, delay to the Contractor's schedule that will extend the Contract Time.
- 8.3.9 With respect to Suspensions of Work under Paragraph 3.6 Suspension of Work herein, the Contractor shall be entitled to an extension of the Contract Time not to exceed the length of time that the Work was suspended (unless as determined under this Article and the other requirements of the Contract Documents that a further extension is justified and warranted) if the claim is submitted in accordance with the requirements of this Article, and if the suspension is not due to any act or omission of the Contractor, any Subcontractor or Sub-subcontractor or any other person or organization for whose acts or omission the Contractor may be liable. The Contractor's claim will be evaluated in accordance with the terms of this Article.
- 8.3.10 The Contractor shall not be entitled to any extension of time for delays resulting from any conditions or other causes unless it shall have given written Notice to the Owner, within seven (7) calendar days following the commencement of each such condition or cause, describing the occurrence, the activities impacted and the probable duration of the delay. The Contractor's complete claim submittal for a time extension shall be submitted no later than twenty (20) calendar days after cessation of the delay or within such other longer period as the Owner may agree in writing to allow.
- 8.3.11 No such extension of time shall be deemed a waiver by the Owner of his right to terminate the Contract for abandonment or delay by the Contractor as herein provided or to relieve the Contractor from full responsibility for performance of his obligations hereunder.

8.4 CHANGE ORDER WORK

- 8.4.1 The Contractor shall make every reasonable effort to perform Change Order work within the Contract Time and in such manner as to have minimum delaying effects on all remaining work to be performed under the contract. If, however, the Change Order work results in an unavoidable increase in the time required to complete the project, an extension of the Contract Time may be granted to the Contractor for the Change Order work. The Contractor's request therefor shall be determined in accordance with the provisions of Article 8.3 Claims for Time Extensions herein and as follows:
- .1 If the time required for performance of the Change Order work has an unavoidable direct delaying effect on the primary sequence of work activities remaining after rescheduling (e.g., the critical path in CPM type scheduling), the overall contract time may be extended by the minimum number of days required for the Change Order work as mutually agreed upon by the Owner and the Contractor;
 - .2 If the time required for performance of the Change Order work does not have an unavoidable direct delaying effect on the primary sequence of work activities but is ordered by the Owner at a time such that insufficient Contract Time remains for completion of the Change Order work (and any limited number of contingent work activities), the Contract Time may be extended by the minimum number of days required

for the Change Order work as mutually agreed upon by the Owner and the Contractor but only for the Change Order work and contingent activities, all other unaffected work shall be performed within the Contract Time;

- .3 Failure of the Owner and the Contractor to agree on a Contract Time extension as specified in .1 and .2 above shall not relieve the Contractor from proceeding with and performing the Change Order work promptly, as well as in such manner as to have minimal delaying effects on all remaining work to be performed under the Contract. Such disagreement shall be resolved as soon as practical by negotiation.

8.5 LIQUIDATED DAMAGES FOR DELAY

- 8.5.1 The damages incurred by the Owner due to the Contractor's failure to complete the Work within required Milestone dates and the Contract Time, including any extensions thereof, shall be in the amount set forth in the Construction Agreement, for each consecutive day beyond the Milestone dates or the Contract Time (Sundays and all holidays included) for which the Contractor shall fail to complete the Work.
- 8.5.2 The amount of liquidated damages provided in this Contract is neither a penalty nor a forfeiture and shall compensate the Owner solely for the Owner's inability to use the Work for its fully intended purpose, and is not intended to, nor does said amount include: (1) any damages, additional or extended costs, incurred by the Owner for extended administration of this Contract, or by the Owner's agents, consultants or independent contractors for extended administration of this Contract, or (2) any additional services, relating to or arising as a result of the delay in the completion of the Work. Owner shall be entitled to claim against Contractor for its actual damages and any amounts not specifically included within the liquidated damages as set forth herein. Such costs shall be computed separately and together with liquidated damages, either deducted from the Contract Sum or billed to the Contractor, at the option of the Owner.

8.6 TIME EXTENSIONS FOR WEATHER

- 8.6.1 The Contract Time will not be extended due to inclement weather conditions that are normal to the general locality of Work site. The time for performance of this Contract includes an allowance for workdays (based on a 5-day workweek) which, according to historical data, may not be suitable for construction work.
- .1 The following is the schedule of monthly anticipated normal inclement weather workdays for the project location and will constitute the base line for monthly weather time extension evaluations.

ANTICIPATED NORMAL INCLEMENT WEATHER WORK-DAYS INCLUDED IN THE CONTRACT TIME OF PERFORMANCE											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
7	7	7	7	9	7	7	7	6	6	6	7

- 8.6.2 The Contractor, in his planning and scheduling of the Work as required by the Contract Documents, shall allow for the normal inclement weather for the locality of the Work site. If the Contractor believes that the Progress of the Work has been adversely affected and that it will directly result in a failure to meet Completion within the Contract Time, by weather conditions above and beyond the amount normally expected, he shall submit a written request to the Owner with a copy to the A/E for an Extension of Time, pursuant to Paragraph 8.3 Claims for Time Extensions.

- 8.6.3 Such request shall be evaluated by the Owner in accordance with the provisions of the Contract Documents and shall include a comparison of actual weather statistics compiled by City of Lynchburg's Department of Public Works, for the time of year, locality of the particular Work site with the days claimed by the Contractor and the anticipated normal inclement weather as stated in subparagraph 8.6.1. The normal inclement weather expected has been included in the designated Contract time for completion. The decision of the Owner shall be final.
- 8.6.4 The Contractor shall not be entitled to any money damages whatsoever for any delays resulting from inclement weather, whether normal or abnormal, foreseeable or unforeseeable. The Contractor and Owner stipulate and agree that for delays due to weather as determined in 8.6.3, the Contractor's sole relief is a time extension granted in accordance with this Article 8.6 Time Extensions for Weather.

ARTICLE 9 PAYMENTS AND COMPLETION

9.1 *CONTRACT SUM*

- 9.1.1 The Contract Sum is stated in the Construction Agreement and, including authorized adjustments thereto, is the total amount payable by the Owner to the Contractor for the performance of the Work under the Contract Documents. The Contract Sum includes, but is not limited to, the Contractor's profit and general overhead and all costs and expenses of any nature whatsoever (including without limitation taxes, labor and materials), foreseen or unforeseen, and any increases in said costs and expenses, foreseen or unforeseen, incurred by the Contractor in connection with the performance of the Work, all of which costs and expenses shall be borne solely by the Contractor. The Contractor agrees to assume all increases in costs of any nature whatsoever that may develop during the performance of the Work.

9.2 *SCHEDULE OF VALUES*

- 9.2.1 For Lump Sum Price Type Contracts, before the pre-construction meeting, the Contractor shall submit to the Owner and A/E, a schedule of values allocated to the various portions of the Work, prepared on payment forms provided by the Owner and supported by such data to substantiate its accuracy as the Owner may require. This schedule of values, unless rejected by the Owner, shall be used as a basis for the Contractor's Applications for Payment.
- 9.2.2 For Unit Price type contracts, the Contractor shall utilize the payment request form provided by the Owner, wherein the schedule of values shall correspond with the individual unit price bid items. When so requested by the Owner, the Contractor shall provide a more detailed cost breakdown of the unit price items.
- 9.2.3 Contractor may include in his schedule of values a line item for "mobilization" which shall include a reasonable amount for mobilization for the Contractor and his Subcontractors. The Contractor shall not front-end load his schedule of values.

9.3 *APPLICATION FOR PAYMENT*

- 9.3.1 The Contractor shall submit to the A/E three (3) originally executed, itemized Application for Payment (and one (1) copy to the Owner) on or about the day of each month determined by the Owner. The Application for Payment shall be notarized, indicate in complete detail all labor and material incorporated in the Work during the month prior to submission, and supported by such data substantiating the Contractor's payment request as the Owner may require. The Application for Payment shall also contain Contractor's certification that due and payable amounts and bills have been paid by the Contractor for work for which previous Certificates of Payment were issued and payments received from the Owner.

- 9.3.2 Payment may be made for the value of materials, which are to be incorporated into the finished Work, and which are delivered to and suitably stored and protected on the Work site. The Contractor shall provide releases or paid invoices from the Seller to establish, to the Owner's satisfaction, that the Owner has title to said material. Stored materials shall be in addition to the Work completed and shall be subject to the same retainage provisions as the completed Work. Material once paid for by the Owner becomes the property of the Owner and may not be removed from the Work site without the Owner's written permission.
- 9.3.3 The requirements for the payment of materials stored on-site shall remain unchanged. The requirements for payment for materials stored off-site shall include, but is not limited to, those specified in Paragraph 9.3.2 and the additional requirements hereinafter specified. Material stored off-site under this provision shall be included in the definition of Work, Article 1 Contract Documents.
- 9.3.3.1. The requirements of Paragraph 10.2 Safety of Persons and Property are fully applicable to materials stored off-site.
- 9.3.3.2 For purposes of administering this provision, the following definitions are provided.
- a. Material stored NEAR the Work Site: A storage location shall be considered near the work site if it is not more than fifty (50) miles (approximately a one-hours drive) from the Work Site.
 - b. Material stored DISTANT from the Work Site: Locations beyond the limit of fifty (50) miles shall be considered distant.
- 9.3.3.3 All proposed off-site locations, regardless of whether they are near or distant, shall be approved by the Owner prior to any payment under this Article. The approval process will include an inspection of the proposed storage site, which may or may not coincide with any inspection of materials stored.
- 9.3.3.4 Prior to payment for any material stored off-site, said material shall be inspected to verify that it is properly stored; i.e., segregated, inventoried, identified as the property of the Owner and Contractor and duly protected as required in Article 10.2 Safety of Persons and Property. This material shall be clearly identified and physically segregated from any other material or stock, in such a manner that it is clear, from casual observation, that said material is not a part of any other stock or stored material.
- 9.3.3.5 For materials stored distant to the Work site, the Contractor shall reimburse the Owner for all reasonable costs incurred by the Owner, to include but not limited to salary, transportation, lodging and per diem, for the Owner's or the A/E's employees to travel to and from the storage locations for the purpose of verifying the material is properly stored. It is anticipated that such trips would occur whenever additional material is claimed for payment and/or at least every six (6) months until the material is delivered to the work site.
- 9.3.3.6 Except for unusual circumstances, the Contractor will not be required to reimburse the Owner's costs for visits to storage locations near the work site.
- 9.3.3.7 The Contractor shall hold the Owner harmless from any and all losses, additional costs, direct or indirect damages and/or delays, whatsoever, which may occur as a result of a failure of the Contractor to deliver (or have delivered), in a timely manner, materials (for which payment has been made) to the work site for installation and incorporation into the Work.
- 9.3.3.8 The Contractor shall provide to the Owner, a Release of Lien or other suitable certification by the Seller, in addition to paid invoices, verifying that the Contractor has valid title to all materials

for which payment is requested. The Seller, however, shall not be required to waive his rights for recovery, if his contract is breached.

- 9.3.4 The Contractor warrants that title to all Work, materials and equipment covered by an Application for Payment will pass to the Owner either by incorporation in the construction or upon the receipt of payment by the Contractor, whichever occurs first, free and clear of all liens, claims, security interests or encumbrances, hereinafter referred to as "liens". The Contractor further warrants that no Work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor or by any other person performing Work at the site or furnishing materials and equipment for the Project that is subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person.
- 9.3.5 The Contractor's Application for Payment shall provide that the payment request attests that all Work for which the request is made has been completed in full according to the drawings, specifications and other terms of the Contract Documents. By submitting his Application for Payment, the Contractor also represents that he has no knowledge that any Subcontractor or suppliers have not been fully and timely paid and that, insofar as he knows, the only outstanding items for payment with respect to the Contract are those to be paid from the funds for which Application is being made.

9.4 CERTIFICATES FOR PAYMENT

- 9.4.1 The A/E will, within seven (7) calendar days after the receipt of the Contractor's Application for Payment, recommend a Certificate for Payment to the Owner, for such amount as the A/E determines is properly due, with his reasons for withholding or adjusting a Certificate as provided in Paragraph 9.6 Payments Withheld, if any.
- 9.4.2 After the Certificate for Payment is recommended by the A/E, the Owner will review it and make any changes deemed necessary by the Owner's Representative. The recommendation of the Certificate for Payment by the A/E does not waive or limit the Owners right to reduce the amount of the payment due to the Contractor as determined to be appropriate by the Owner.
- 9.4.3 The recommendation of a Certificate for Payment will constitute a representation by the A/E to the Owner, based on his observations at the site as provided in Article 2 Architect/Engineer hereof and the data comprising the Application for Payment, that the Work has progressed to the point indicated; that, to the best of his knowledge, information and belief: (1) the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial or Final Completion, to the results of any subsequent tests required by or performed under the Contract Documents, to minor deviations from the Contract Documents correctable prior to completion, and to any specific qualifications stated in his Certificate); and that (2) the Contractor is entitled to payment in the amount certified. However, by recommending a Certificate for Payment, the A/E shall not thereby be deemed to represent that he has made exhaustive or continuous on-site inspections to check the quality or quantity of the Work or that he has reviewed the construction means, methods, techniques, sequences or procedures, or that he has made any examination to ascertain how or for what purpose the Contractor has used the moneys previously paid on account of the Contract Sum.
- 9.4.3.1(1) The form of each application for payment shall be on a form approved by the City. Payment for stored material delivered but not incorporated in the work will be the invoiced amount only. Stored materials drawdown shall be approved by the Owner. Submit applicable invoices with Application for Payment. Monthly partial payment request shall be submitted in **TRIPPLICATE** to Owners representative for approval by the 25th of the month so that the Owner can approved payment request by the first working day of the next month. Partial payments shall be made on a

monthly basis on or before the end of the next month for which the work was performed, in accordance with the Contract Documents.

- (2) The Owner shall pay to the Contractor 95 percent of the total amount due and the Owner shall retain ten (5) percent of the amount due until all work has been performed strictly in accordance with the Contract Documents and until such work has been accepted by the Owner.

- 9.5.1 The Owner shall make payment in the manner and within thirty (30) calendar days after receipt of the Certificate of Payment from the A/E based upon the Owner's approval or adjustment of said Certificate. The Contractor shall be paid the amount approved or adjusted by the Owner, less 5% retainage which is being held to assure faithful performance; provided however, that said retainage is not applicable to Time and Material Change Orders.
- 9.5.1.1 In relation to punch list or other uncompleted work and in lieu of a portion of the above-specified five- percent 5% retainage, the Owner may, at its sole discretion, elect to retain fixed amounts directly relating to the various items of uncompleted Work. All amounts withheld shall be included in the Final Payment.
- 9.5.2 The Contractor shall, within seven (7) days after receiving payment from the Owner, do one of the following:
 1. Pay all Subcontractors for the proportionate share of the total payment received from the Owner for work performed by each Subcontractor under the contract; or
 2. Notify the Owner and Subcontractor(s), in writing, of his intention to withhold all or part of the Subcontractor's payment with the reason for nonpayment.
- 9.5.3 The Contractor shall make payment to Subcontractors as heretofore specified. Each payment shall reflect the percentage actually retained, if any, from payments to the Contractor on account of such Subcontractor's Work.
- 9.5.4 The Contractor shall provide the Owner with his social security number, if an individual, and their federal identification number if a corporation, partnership, or proprietorship.
- 9.5.5 The Contractor shall be obligated to pay unpaid Subcontractors interest on payments that are not made in accordance with this Article 9.5 Progress Payments. The rate of interest shall be in compliance with the Prompt Payment section of the Virginia Public Procurement Act of the Code of Virginia. The Contractor shall, by an appropriate agreement with each Subcontractor require each Subcontractor to make payments to his sub-subcontractors according to all the same requirements as provided in this Article 9.5 Progress Payments.
- 9.5.6 The Owner may, upon written request, furnish to any Subcontractor, if practicable, information regarding the percentages of completion or the amounts applied for by the Contractor and the action taken thereon by the Owner on account of Work done by such Subcontractor.
- 9.5.7 Neither the Owner nor the A/E shall have any obligation to pay or to see to the payment of any monies to any Subcontractor except as may otherwise be required by law.
- 9.5.8 No Certificate for a progress payment, nor any progress payment, nor any partial or entire use or occupancy of the Project by the Owner, shall constitute an acceptance of any Work not in accordance with the Contract Documents.

9.6 PAYMENTS WITHHELD

- 9.6.1 The Owner may withhold the payment in whole or in part, if necessary to reasonably protect the Owner. If the A/E is unable to make representations as provided in subparagraph 9.4.3 and to recommend payment in the amount of the application, he will notify the Owner as provided in subparagraph 9.4.1. If the Contractor and the Owner cannot agree on a revised amount, the Owner will promptly issue a Certificate for Payment for the amount for which he is able to make representations with respect to payment due for work performed. The Owner may also decline to certify or make payment or, because of subsequently discovered evidence or subsequent observations, the Owner may nullify the whole or any part of any Certificate for Payment previously issued.
- 9.6.2 The Owner may withhold from the Contractor so much of any payment approved by the A/E, as may in the judgment of the Owner be necessary:
- .1 To protect the Owner from loss due to defective work not remedied;
 - .2 To protect the Owner upon receipt of notice of the filing in court or in an arbitration proceeding as may be required in any third party contract, of verified claims of any persons supplying labor or materials for the Work, or other verified third party claims;
 - .3 To protect the Owner upon reasonable evidence that the Work will not be completed for the unpaid balance of the Contract Sum;
 - .4 To protect the Owner upon reasonable evidence that the Work will not be completed within the Contract Time established by this Contract; or
 - .5 To protect the Owner upon the Contractor's failure to properly schedule and coordinate the work in accordance with or as required by the Contract Documents, or failure to provide progress charts, revisions, updates or other scheduling data as required by the Contract Documents, or upon the Contractor's failure to provide as-built drawings as required herein, or upon Contractor's failure to otherwise substantially or materially comply with the Contract Documents.
- 9.6.3 If required by the Construction Agreement, the Contractor shall, concurrent with his submission of the Construction Schedule, submit a practicable and realistic payment schedule showing the dates on which the Contractor will submit each and every Application for Payment and the amount he expects to receive for each and every monthly progress payment. If during the performance of the Work, the Contractor expects to receive an amount for a monthly progress payment larger than that indicated on the payment schedule, the Contractor shall notify the Owner at least thirty (30) days in advance of that payment so that the necessary allocation of funds can be processed. In the event the Contractor fails to submit a practicable and realistic payment schedule, the Contractor's Application for Payment shall be honored only to the extent that the Work is actually performed and that the proportion of payments made to the Contract Sum does not exceed the proportion of the Contract Time expired as of the time of the request.

9.7 FAILURE OF PAYMENT

If the Owner does not make payment to the Contractor within the thirty (30) calendar days after receipt of the Contractor's Application for Payment by the A/E through no fault of Contractor, and the Owner otherwise not being entitled under the Contract Documents or applicable law to withhold payment, then the Contractor may, upon fifteen (15) additional days' written Notice to the Owner and the A/E, stop the Work until payment of the amount owing has been received. In such event, the Contract Sum shall be increased by the amount of the Contractor's reasonable

costs of shutdown, delay and start-up, which shall be effected by appropriate Change Order as provided herein.

9.8 SUBSTANTIAL COMPLETION AND GUARANTEE BOND

9.8.1 Unless otherwise specified in Article 9.9 Final Completion and Final Payment, when the Contractor considers that the Work, or a designated portion thereof which is acceptable to the Owner, is substantially complete as defined in Article 8 Contract Time, the Contractor shall request in writing that the A/E and the Owner perform a Substantial Completion inspection. Prior to such inspection the Contractor shall:

.1 If applicable, secure a Certificate of Occupancy for the Project or a designated portion thereof; and

.2 Submit five (5) copies each of the Operations and Maintenance Manuals to the A/E as specified and one (1) copy to the Owner.

9.8.2 The Owner shall determine whether the project is substantially complete and shall compile a punch list of items to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

9.8.3 When the Owner on the basis of his inspection determines that the Work or a designated portion thereof is substantially complete, the A/E will then prepare a Certificate of Substantial Completion which shall establish the Date of Substantial Completion and shall state the responsibilities of the Owner and the Contractor for security, maintenance, heat, utilities, damage to the Work and insurance. The Certificate of Substantial Completion shall be submitted to the Owner and the Contractor for their written acceptance of the responsibilities assigned to them in such Certificate.

9.8.4 The Contractor shall have thirty (30) days from the Date of Substantial Completion to complete all items on the punch list to the satisfaction of the Owner. If the Contractor fails to complete all punch list items within the designated time, the Owner shall have the option to correct or conclude any remaining items by utilizing its own forces or by hiring others. The cost of such correction of remaining punch list items by the Owner or others shall be deducted from the final payment to the Contractor.

9.8.5 Guarantees and warranties required by the Contract Documents shall commence on the Date of Final Completion of the Work, unless otherwise provided in the Certificate of Substantial or Final Completion, or the Contract Documents. Provided, however, that if Contractor does not complete certain punch list items within this time period, specified in 9.8.4, all warranties and guarantees for such incomplete Punch List items shall become effective upon issuance of final payment for the project.

9.8.5.1 The Contractor shall guarantee for a term of one (1) year from the date of Final Completion or Final Payment, (unless otherwise provided for in the Certificate(s) of Substantial or Final Completion or the Contract Documents): (1) the quality and stability of all materials equipment and Work; (2) all the Work against defects in materials, equipment or workmanship; and (3) all shrinkage, settlement or other faults of any kind which are attributable to defective materials or workmanship. The Contractor shall remedy at his own expense, when so notified in writing to do so by the Owner, and to the satisfaction of the Owner, the Work or any part thereof that does not conform to any of the warranties and guaranties described in the Contract Documents.

9.8.5.2 In order to make good the guarantee as herein required, the Contractor shall deposit with the Owner, after Substantial Completion but before Final Payment, a Guarantee Bond(s) issued by a

surety licensed to do business in Virginia and otherwise acceptable to the Owner, for the faithful performance of the guarantee. Said Bond(s) shall be for a period of one (1) year and in the amount of five percent (5%) of the final gross value of the Contract.

- 9.8.5.3 The Contractor shall complete repairs during the guarantee period, within five (5) working days after the receipt of Notice from the Owner and if the Contractor shall fail to complete such repairs within the said five (5) working days, the Owner may employ such other person or persons as it may deem proper to make such repairs and pay the expenses thereof out of any sum retained by it, provided nothing herein contained shall limit the liability of the Contractor or his surety to the Owner for non-performance of the Contractor's obligations at any time.
- 9.8.6 The issuance of the Certificate of Substantial Completion does not indicate final acceptance of the project by the Owner, and the Contractor is not relieved of any responsibility for the project except as specifically stated in the Certificate of Substantial Completion.
- 9.8.7 Upon Substantial Completion of the Work, or designated portion thereof, and upon application by the Contractor and certification by the A/E, the Owner shall make payment, adjusted for retainage and payments withheld, if any, for such Work or portion thereof, as provided in the Contract Documents.
- 9.8.8 Should the Owner determine that the Work or a designated portion thereof is not substantially complete, he shall provide the Contractor a written Notice stating why the project or designated portion is not substantially complete. The Contractor shall expeditiously complete the Work and shall re-request in writing that the Owner perform a substantial completion inspection.

9.9 FINAL COMPLETION AND FINAL PAYMENT

- 9.9.1 A Certificate of Final Completion shall be issued by the A/E prior to final payment. At the Owner's sole option, this Final Completion Certificate may be issued without a Certificate of Substantial Completion. The Contractor, prior to application for Final Payment and within the time specified for completion of the Work, shall complete all Work, to include punch list items and provide operating manuals and as-built data, for the Work, as completed and in place. Said Certificate of Final Completion shall be issued, even if a Certificate of Substantial Completion has been issued previously and temporary authority to operate the Work has been granted.
- 9.9.1.1 The Certificate of Final Completion shall certify that all Work has been completed in accordance with Contract Documents and is ready for use by the Owner.
- 9.9.2 For all projects where Substantial Completion Certificates have been issued for various portions of the Work, at differing times, the Contractor shall request and the Owner shall, prior to final payment, issue a Certificate of Final Completion which certifies that all required Work, including punch list items, has been completed in accordance with the Contract Documents.
- 9.9.3 Neither the final payment nor any remaining retainage shall become due until the Contractor submits to the A/E the following:
- .1 An Application for Payment for all remaining monies due under the Contract.
 - .2 Consent of surety, if any, to final payment;
 - .3 If required by the Owner, other data establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of claims arising out of the Contract, to the extent and in such form as may be designated by the Owner. If any Subcontractor refuses to furnish waiver of claims satisfactory to the Owner, the Contractor may furnish

a bond satisfactory to the Owner to indemnify him against any such claim. If any such claim remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such claim, including all costs and reasonable attorneys' fees;

- .4 As-built drawings, operation and maintenance manuals and other project closeout submittals, as required by the Contract Documents;
- .5 Construction releases as required by the Contract Documents from each property owner on whose property an easement for construction of this project has been obtained by the Owner, such release to be in the forms to be provided by the Owner. This release is for the purpose of releasing the Owner and the Contractor from liability, claims, and damages arising from construction operations on or adjacent to the easement and includes proper restoration of the property after construction. It shall be the Contractor's sole responsibility to obtain all such releases and furnish them to the Owner; and
- .6 A written certification that:
 - .1 The Contractor has reviewed the requirements of the Contract Documents,
 - .2 The Work has been inspected by the Contractor for compliance with all requirements of the Contract Documents,
 - .3 Pursuant to this inspection, the Contractor certifies and represents that the Work complies in all respects with the requirements of the Contract Documents,
 - .4 The Contractor further certifies and represents that all equipment and systems have been installed in accordance with the Contract Documents and have been tested in accordance with specification requirements and are operational, and
 - .5 The Contractor hereby certifies and represents that the Work is complete in all respects and ready for final inspection.

- 9.9.4 Upon receipt of the documents required in subparagraph 9.9.3 and upon receipt of a final Application for Payment, the A/E and Owner will promptly make a final inspection. When the A/E finds the Work acceptable under the Contract Documents and the Contract fully performed, he will promptly issue a final Certificate for Payment and a Final Certificate of Completion.

The Certificate of Completion will state that to the best of his knowledge, information and belief, and on the basis of his observations and inspections, the Work has been completed in accordance with the terms and conditions of the Contract Documents and that the entire balance designated in the final certificate for payment is due and payable. The final Certificate for Payment will constitute a further representation that the conditions precedent to the Contractor's being entitled to final payment as set forth in Subparagraph 9.9.3 have been fulfilled. The Owner shall review the Certificate of Payment and shall accept it and issue final acceptance, or reject it and notify the Contractor, within ten (10) days. Final payment to the Contractor shall be made within thirty (30) days after final acceptance. All prior estimates and payments, including those relating to change order work shall be subject to correction by this final payment.

- 9.9.5 The making of Final Payment shall constitute a waiver of all claims by the Owner, except those arising from:
- .1 Unsettled claims;

- .2 Faulty, defective, or non-conforming Work discovered or appearing after Substantial or Final Completion;
 - .3 Failure of the Work to comply with the requirements of the Contract Documents;
 - .4 Terms of any warranties or guarantees required by the Contract Documents; or
 - .5 Fraud or bad faith committed by the Contractor or any subcontractor or supplier during performance of work but discovered by Owner after Final Payment.
- 9.9.6 The acceptance of Final Payment shall constitute a waiver of all claims by the Contractor, except those previously made in writing and so identified by the Contractor, as unsettled at the time of the final Application for Payment. No payment, however, final or otherwise, shall operate to release the Contractor or his sureties from any obligations under this Contract or the Performance or the Guarantee Bonds.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

- 10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. The requirement applies continuously throughout the Contract performance, until Final Payment is made, and is not limited to regular working hours.

10.2 SAFETY OF PERSONS AND PROPERTY

- 10.2.1 The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:

- .1 All employees on the Work and all other persons who may be affected thereby;
- .2 All the Work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of his Subcontractors or Sub-subcontractor's. Machinery, equipment and all hazards shall be guarded or eliminated in accordance with the safety provisions of the Manual of Accident Prevention in Construction published by the Associated General Contractors of America, to the extent that such provisions are not in contravention of applicable law; and
- .3 Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

- 10.2.2 The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations, permits, resolutions and lawful orders of any public authority bearing on the safety of persons or property or their protection from damage, injury or loss.

The Contractor shall at all times safely guard the Owner's property from injury or losses in connection with the Contract. He shall at all times safely guard and protect his own work and adjacent property as provided by law and the Contract Documents, from damage. All passageways, guard fences, lights and other facilities required for protection by local authorities or local conditions must be provided and maintained without additional cost to the Owner.

- 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and

other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities.

10.2.4 When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.

10.2.5 The Contractor is responsible for the proper packing, shipping, handling and storage (including but not limited to shipment or storage at the proper temperature and humidity) of materials to be incorporated in the Work, so as to insure the preservation of the quality and fitness of the material for proper installation and incorporation in the Work, as required by the Contract Documents.

For example, but not by way of limitation, Contractor shall, when necessary, place material on wooden platforms or other hard and clean surfaces and not on the ground and/or place such material under cover or in any appropriate shelter or facility. Stored materials or equipment shall be located so as to facilitate proper inspection. Material and equipment that is delivered crated shall remain crated until ready for installation. Lawns, grass plots or other private property shall not be used for storage purposes without the written permission of the owner or lessee unless otherwise within the terms of the easements obtained by the Owner.

10.2.6 In the event of any indirect or direct damage to public or private property referred to in Paragraphs 10.2.1.2 and 10.2.1.3, caused in whole or in part by an act, omission or negligence on the part of the Contractor, any Subcontractor, any Sub-subcontractor, or anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable, the Contractor shall at his own expense and cost promptly remedy and restore such property to a condition equal to or better than existing before such damage was done. The Contractor shall perform such restoration by underpinning, replacing, repairing, rebuilding, replanting, or otherwise restoring as may be required or directed by the Owner, or shall make good such damage in a satisfactory and acceptable manner. In case of failure on the part of the Contractor to promptly restore such property or make good such damage, the Owner may, upon two (2) calendar days written Notice, proceed to repair, replace, rebuild or otherwise restore such property as may be necessary and the cost thereof, or a sum sufficient in the judgment of the Owner to reimburse the owners of property so damaged, will be deducted from any monies due or to become due the Contractor under the Contract.

10.2.7 The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents and the protection of material, equipment and other property. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner.

10.2.8 The Contractor shall not load or permit any part of the Work to be loaded so as to endanger the safety of any portion of the Work.

10.2.9 The Contractor shall give notice in writing at least forty-eight (48) hours before breaking ground, to all persons, Public Utility Companies, owners of property having structures or improvements in proximity to site of the Work, superintendents, inspectors, or those otherwise in charge of property, streets, water pipes, gas pipes, sewer pipes, telephone cables, electric cables, railroads or otherwise, who may be affected by the Contractor's operation, in order that they may remove any obstruction for which they are responsible and have representative(s) on site to see that their property is properly protected. Such notice does not relieve the Contractor of responsibility for any damages and claims. Nor does such notice relieve the Contractor from his responsibility to defend and indemnify the Owner from actions resulting from the Contractor's performance of such work in connection with or arising out of the Contract.

- 10.2.10 The Contractor shall protect all utilities encountered while performing its work, whether indicated on the Contract Drawings or not. The Contractor shall maintain utilities in service until moved or abandoned. The Contractor shall exercise due care when excavating around utilities and shall restore any damaged utilities to the same condition or better as existed prior to starting the Work, at no cost to the Owner. The Contractor shall maintain operating utilities or other services, even if they are shown to be abandoned on the Contract Drawings, in service until new facilities are provided, tested and ready for use.
- 10.2.11 The Contractor shall return all improvements on or about the site and adjacent property which are not shown to be altered, removed or otherwise changed to conditions which existed prior to starting work.
- 10.2.12 The Contractor shall protect the Work, including but not limited to, the site, stored materials and equipment, excavations, and excavated or stockpiled soil or other material, intended for use in the Work, and shall take all necessary precautions to prevent or minimize damage to same and to prevent detrimental effect upon his performance or that of his subcontractors, caused by or due to rain, snow, ice, run-off, floods, temperature, wind, dust, sand and flying debris. For example, but not by way of limitation, Contractor shall, when necessary, utilize temporary dikes, channels or pumping to carry-off, divert or drain water, and shall as necessary tie-down or otherwise secure the Work and employ appropriate covers and screens.

10.3 OBLIGATION OF CONTRACTOR TO ACT IN AN EMERGENCY

- 10.3.1 In case of an emergency that threatens immediate loss or damage to property and/or safety of life, the Contractor shall act to prevent threatened loss, damage, injury or death. The Contractor shall notify the Owner of the situation and all actions taken immediately thereafter. If the Contractor fails to act and any loss, damage, injury or death occurs that could have been prevented by the Contractor's prompt and immediate action, the Contractor shall be fully liable to the Owner or any other party for all costs, damages, claims, actions, suits, costs of defense, and all other expenses arising therefrom or relating thereto.
- 10.3.2 Prior to commencing his work and at all times during the performance of the Work, the Contractor shall provide the Owner two, twenty-four hour (24) emergency phone numbers where his representatives can be contacted.

ARTICLE 11 - INSURANCE

A. Contractor's Insurance:

1. During the term of this Contract, the Contractor shall procure and maintain insurance coverages with insurance companies rated by A. M. Best Company as A – VIII or better. The company(ies) shall be authorized to do business under the laws of the Commonwealth of Virginia and be acceptable to the City of Lynchburg and shall provide the following minimum types of insurance:
 - a. **Commercial General Liability Insurance** – This will cover claims for Bodily Injury, Property Damage, Personal and Advertising Injury, Products and Completed Operations, which may arise from operations under the Contract, whether such operations be performed by the Contractor or by any Subcontractor or Independent Contractor, or by anyone directly or indirectly employed by any of them. Such insurance shall include coverages "X", "C" and "U" for explosion, collapse of other

structures and underground utilities, as well as Contractual Liability Insurance covering the requirements outlined in the General Conditions. This insurance shall name the City, the City Council and its employees as additional insureds **by endorsement** to the Commercial General Liability policy. Such policy shall not have a restriction on the limits of coverage provided to the City of Lynchburg as an additional insured. The City of Lynchburg shall be entitled to protection up to the full limits of the Contractor's policy regardless of the minimum requirements specified in this contract. If endorsements to the Commercial General Liability insurance policies cannot be made, then separate policies providing such protection shall be purchased by the Contractor.

1. The Policy shall have the following **minimum** limits:

\$1,000,000 Each Occurrence Limit

\$1,000,000 General Aggregate Limit

\$1,000,000 Personal and Advertising Injury Limit

\$1,000,000 Products and Completed Operations Aggregate Limit

\$5,000 Medical Expense Limit

This insurance shall include the following provisions and /or endorsements:

- 1) The General Aggregate limit shall apply on a "per project" and on a "per location" basis;
- 2) Coverage shall apply to all liability arising from all premises and operations conducted by the Contractor, subcontractors and independent contractors;
- 3) The Contractor agrees that liability arising from Products and Completed Operations will be covered. Such liability coverage will be maintained for two years after completion of the Work.
- 4) The Contractor shall require each of his Subcontractors to procure and maintain Commercial General Liability Insurance of the type specified in this document in the minimum amounts required by the City and the Contractor, during the term of this subcontract.

Worker's Compensation and Employer's Liability Insurance for the Contractor's employees engaged in the Work under this Contract, in accordance with the Statutory requirements of the Commonwealth of Virginia. The Contractor shall require each of his Subcontractors to provide Worker's Compensation and Employer's Liability Insurance for all of the Subcontractor's employees engaged on such subcontracts. If any class of employees engaged on work under the Contract is

not protected under the Worker's Compensation statute, the Contractor shall provide similar protection for these employees in amounts not less than the legal requirements. The amount of Employer's Liability Insurance for the Contractor and each of his Subcontractors shall be not less than:

\$100,000 per employee for Bodily Injury.

\$100,000 per employee for disease

\$500,000 per policy for disease

The Worker's Compensation and Employer's Liability Insurance policy shall include an "all states" or "other states" endorsement.

- d. Commercial **Automobile Liability Insurance**, including coverage for owned, hired, non owned and borrowed vehicles used in the work with *minimum* limits of \$1,000,000 Combined Single Limit per occurrence. This insurance shall name the City, the City Council and its employees as additional insureds *by endorsement* to the Commercial Automobile Liability policy. Such policy shall not have a restriction on the limits of coverage provided to the City of Lynchburg as an additional insured. The City of Lynchburg shall be entitled to protection up to the full limits of the Contractor's policy regardless of the minimum requirements specified in this contract.

- di. **Umbrella Liability or Excess Liability** Insurance with the following *minimum* limits of:

\$5,000,000 Each Occurrence

\$5,000,000 Annual Aggregate

The following policies shall be scheduled as underlying policies:

Commercial General Liability

Commercial Automobile Liability

Employers Liability

This insurance shall name the City, the City Council and its employees as additional insureds *by endorsement* to the Umbrella or Excess Liability policy. Such policy shall not have a restriction on the limits of coverage provided to the City of Lynchburg as an additional insured. The City of Lynchburg shall be entitled to protection up to the full limits of the Contractor's policy regardless of the minimum requirements specified in this contract.

- e. **Builders Risk Property Insurance** covering all risks of direct physical loss to the Work, including flood and earthquake damage. It shall also cover all materials and

supplies whether at the job site, at a separate storage site or while in transit. The policy shall be payable to the City, and the proceeds thereof, when paid, will be retained by the City as security for the performance by the Contractor of his obligations under the terms and conditions of this Contract and, upon such performance, will be released to the Contractor. The policy shall be in an amount equal to the Contract Sum and shall apply to any and all Projects under construction during the term of this Contract.

2. Proof of insurance for each type of coverage listed herein shall be provided within 10 Days after issuance of the Award Letter for the Contract, and no Work shall proceed unless all such insurance is in effect. The Contractor shall not allow any Subcontractor to commence work on his subcontract until all such insurance of the Subcontractor has been so obtained and approved by the Contractor and found to be in accordance with the requirements set forth herein. The Contractor certifies by commencement of the Work that his insurance and that of Subcontractors is in effect and meets the requirements set forth herein.
3. The Contractor shall purchase and maintain required liability and all other insurance as is appropriate for the Work being performed and furnished. The insurance shall provide protection from claims which may arise out of or result from Contractor's performance and furnishing of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed or furnished by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform or furnish any of the Work, or by anyone for whose acts any of them may be liable:
 - a. claims under Worker's Compensation, Employers Liability, disability benefits, and other similar employee benefit acts;
 - b. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
 - c. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
 - d. claims for damages insured by personal injury liability coverage which are sustained: (1) by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor; or (2) by any other person for any other reason;
 - e. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
 - f. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle.

4. The insurance required to be purchased and maintained by the Contractor shall:
 - a. include completed operations insurance;
 - b. with respect to any other insurance coverage written on a claims-made basis, remain in effect for at least 2 years after final payment (and Contractor shall furnish the City and Engineer evidence satisfactory to the City of continuation of such insurance at final payment and 1 year thereafter);
 - c. contain a cross liability or severability of interest clause or endorsement. Insurance covering the specified additional insureds shall be primary insurance, and all other insurance carried by the additional insureds shall be excess insurance.
- B. All of the aforesaid insurance policies must be endorsed to provide that the insurance company ***shall give 30 days written notice to the City*** if the policies are to be terminated or if any changes are made during the Contract period which will affect in any way the insurance requirements required in this contract. Before starting the Work, the Contractor shall provide the City with a copy of each policy which he and each of his Subcontractors shall carry in accordance herewith, together with receipted bills evidencing proof of premium payment. These policies shall contain endorsements to the policies naming the City of Lynchburg as an additional insured as required.
- C. Nothing contained herein shall effect, or shall be deemed to affect, a waiver of the City's sovereign immunity under law.

ARTICLE 12 CHANGES AND MODIFICATIONS IN THE WORK

12.1 CHANGES IN THE WORK

- 12.1.1 The Owner, without invalidating the Contract and without Notice to the surety, may order a Change or Modification in the Work consisting of additions, deletions or other revisions to the general scope of the Contract, or changes in the sequence of the performance of the Work. The Contract Sum and the Contract Time shall be adjusted accordingly. All such Modifications in the Work shall be authorized by Change Order, and all Work involved in a Change shall be performed in accordance with the terms and conditions of this Contract. If the Contractor should proceed with a Change in the Work upon an oral order, by whomsoever given, it shall constitute a waiver by the Contractor of any claim for an increase in the Contract Sum and/or Contract Time, on account thereof.

12.2 FIELD ORDER

- 12.2.1 A Field Order is a written order to the Contractor signed by the Owners designated representative, interpreting or clarifying the Contract Documents or directing the Contractor to perform minor changes in the Work. Any work relating to the issuance of a Field Order shall

be performed promptly and expeditiously and without additional cost to the Owner and within the Contract Time, unless the Contractor submits a Proposed Change Order, defined below, which is approved by the Owner. Field Orders shall be numbered consecutively by date of issuance by the Owner.

12.3 OWNER CHANGE REQUEST

- 12.3.1 A Owner Change Request is a written request from the Owner to the Contractor that describes a proposed Change in the Work. The Contractor is required to submit a complete proposal for the total cost and additional time, if any, necessary to perform the proposed Change in the Work. Owner Change Requests shall be numbered consecutively by date of issuance by the Owner.

12.4 CONTRACTOR'S PROPOSED CHANGE ORDER

- 12.4.1 A Contractor's Proposed Change Order is a written request from the Contractor to the Owner requesting a change in the Contract Amount and/or Contract Time. A Contractor's Proposed Change Order is submitted as a proposal in response to a Owner Change Request or as a claim for an increase in the Contract Sum or Contract Time pursuant to the issuance of a Field Order, or as a result of unforeseen circumstances, such as an unknown site conditions.

Change Orders for unforeseen site conditions will only be entertained if the Contractor has not accepted responsibility for the unforeseen site conditions pursuant to other provisions in the Contract Documents. A Contractor's Proposed Change Order must be submitted within twenty (20) calendar days of the issuance of a Owner Change Request or a Field Order or the discovery of an unforeseen circumstance. The CONTRACTOR shall not be entitled to time and/or costs of any nature from the OWNER as a result of his failure to comply with this provision. Contractor's Proposed Change Orders shall be numbered consecutively by date of issuance by the Contractor. The Contractor shall also indicate on the Proposed Change Order the number of the Owner Change Request or the Field Order to which it responds. The Contractor understands and agrees to the City's provisions and policy regarding Change orders as outlined in Article 1 section 1.12 of the General Requirements.

- 12.4.2 In the case of unit price items, it is understood and agreed by the Contractor that the estimates of the quantities in unit price items are approximate only and presented solely for the purpose of comparing bids and may not represent the actual amount of work to be performed. The Contractor, therefore, understands and agrees that the Owner reserves the right to increase, decrease or eliminate entirely the quantity of work to be done under any item. If called upon to do more work under any unit price item named in the Bid Documents, he will perform all such additional work and accept as payment the unit price named in the proposal, subject to the 20% deviation limitations specified in subparagraph 12.4.2.2.
- 12.4.2.1 The Contractor's Proposed Change Order shall be determined by applicable unit prices, if any, as set forth in the Contract.
- 12.4.2.2 However, if changes in quantities are greater or lesser than twenty percent (20%) of the original bid quantity the Owner or the Contractor shall have the right to request a decrease or an increase in the unit price for the quantity greater than 120% or less than 80% of the original bid quantity.
- 12.4.2.3 It shall be understood that such unit prices shall constitute full payment for the extra work performed, including, but not limited to, "general conditions" costs, plant, materials, labor, equipment, overhead, profit, and safety requirements.

- 12.4.3 If no such unit prices are set forth, the Contractor's proposal shall be on a lump sum basis and shall be itemized and segregated by labor, equipment, and materials for the various components of the Change in the Work (no aggregate labor total will be acceptable) and shall be accompanied by signed proposals of any Subcontractors who will perform any portion of the Change in the Work and of any persons who will furnish materials or equipment for incorporation therein.
- 12.4.3.1 The portion of the proposal relating to labor, whether by the Contractor's forces or the forces of any of its Subcontractors, may include reasonably anticipated gross wages of Job Site labor, including foremen, who will be directly involved in the Change in the Work (for such time as they will be so involved), plus separately identified payroll costs (including premium costs of overtime labor, if overtime is authorized, Social Security, Federal or State unemployment insurance taxes and fringe benefits required by collective bargaining agreements entered into by the Contractor or any such Subcontractor in connection with such labor).
- 12.4.3.2 The portion of the proposal relating to materials may include the reasonably anticipated direct costs to the Contractor or to any of its Subcontractors of materials to be purchased for incorporation in the Change in the Work, plus transportation and applicable sales or use taxes.
- 12.4.3.3 The proposal may further include the Contractor's and any of his Subcontractor's reasonably anticipated equipment rental costs, except small hand tools, in connection with the Change in the Work.
- 12.4.4 Base Cost is defined as the total of labor, material and equipment rentals as described in subparagraphs 12.4.3.1, 12.4.3.2 and 12.4.3.3. The actual net cost in money to the Owner for the Change in the Work shall be computed as follows:
- .1 If the Contractor performs the Change in the Work without use of subcontractors or sub-subcontractors, his compensation will be the Base Costs as described above, plus a maximum mark-up of 15% for overhead and profit.
 - .2 If the work is performed by a bona fide Subcontractor, his compensation will be the Base Costs as described above plus a maximum mark-up of 15% for overhead and profit. The Contractor's compensation will be a maximum mark-up of five percent (5%) of the Subcontractors Base Costs for his overhead and profit.
 - .3 If the work is performed by a bona fide Sub-subcontractor, his compensation will be the Base Costs as herein described plus a maximum mark-up of 15% for overhead and profit. The mark-up of any Sub-subcontractor's work by the Contractor and all intervening tiers of Subcontractors shall not exceed a total of 10%.
- 12.4.5 The mark-up on the cost of labor, materials, and equipment described in Paragraphs 12.4.4.1, 12.4.4.2, and 12.4.4.3 shall compensate the Contractors, Subcontractor and Sub-subcontractor for all indirect costs associated with or relating to the Change in the Work including, but not limited to, labor and/or equipment inefficiency, changes in sequence, delays, interferences, impact on unchanged work, gross receipts tax, superintendent, small tools, reproduction, administration, insurance, unrelated safety requirements, temporary structures and offices, all other general and administrative, home office and field office expenses.
- 12.4.6 The Proposed Change Order may also include the cost of increases in premiums for the Standard Labor and Material Payment Bond and the Standard Performance Bond, provided coverage for the cost of the Change in Work results in such increased costs. At the Owner's request, the Contractor shall provide proof of his notification to the Surety of the change in the Work and of the Surety's agreement to include such change in its coverage. The cost of the increase in premiums shall not be marked up.

- 12.4.7 In the event that it is necessary to increase the Contract Time in order to perform the Change in the Work, the Contractor shall provide an estimate of the increase in the Contract Time as part of the Proposed Change Order.. The Contractor's request for a time extension shall be evaluated in accordance with the criteria described in Article 8.3 Claims for Time Extensions.
- 12.4.8 If the Contractor's Proposed Change Order is rejected by the Owner as being within the scope of the Work required by the Contract Documents the Owner may, at its sole option and discretion, direct the Contractor to perform the Work which is the subject of the said Proposed Change Order; the Contractor shall then promptly proceed with said Work. Nothing herein shall excuse the timely performance by the Contractor of the Work because any Proposed Change Order is pending.

12.5 CHANGE ORDER

- 12.5.1 A Change Order is a written order to the Contractor signed by the Owner, issued after execution of the Contract, authorizing a Change in the Work or an adjustment in the Contract Sum and/or the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order. A Change Order signed by the Contractor indicates his agreement therewith, including the adjustment in the Contract Sum and/or the Contract Time. Change Orders shall be numbered consecutively by date of issuance by the Owner and shall, if applicable, indicate the number of the Field Order(s), Request for Proposal(s) and/or Proposed Change Order(s) to which it relates.
- 12.5.1.1 If the Owner determines that the Contractor's Proposed Change Order, submitted pursuant to Article 12.4 for a change in the Contract Sum or Contract Time, is acceptable, the Owner shall prepare and issue a Change Order which will authorize the Contractor to proceed with the Change in the Work for the cost and time stated in the Proposed Change Order, or as otherwise may be agreed upon by the parties. The amounts stated in the Change Order for the cost and time to perform the Change in the Work shall be binding on the parties.
- 12.5.2 After issuance of the Change Order, the Contractor shall ensure that the amount of the Performance and Payment Bond coverage has been revised to reflect the increase in the Contract Sum due to the Change Order.
- 12.5.3 If the Contractor's Proposed Change Order is not acceptable to the Owner or if the parties are unable to otherwise agree as to the cost and time necessary to perform the Change in the Work, the Owner may, at its sole option and discretion, direct the Contractor to perform the Work on a time and material basis. The Contractor shall then promptly proceed with the Work.
- 12.5.4 If the Owner elects to have the Change in the Work performed on a time and material basis, the same shall be performed, whether by the Contractor's forces or the forces of any of its Subcontractors or Sub-subcontractor's, at actual cost to the entity performing the Change in the Work (without any charge for administration, clerical expense, supervision or superintendent of any nature whatsoever). The percent mark-ups for the Contractor, Subcontractors and Sub-subcontractor's shall be as described in subparagraphs 12.4.4 and 12.4.5.
- 12.5.4.1 Prior to starting the work on a time and material basis, the Contractor shall notify the Owner in writing as to what labor, materials, equipment or rentals are to be used for the Change in the Work. During the performance of the Change, the Contractor shall submit to the Owner daily time and material tickets, which shall list the categories and amounts of labor and equipment for which Change Order compensation is to be charged for the previous work day. Such tickets shall specifically include the following information: location and description of the Change in the Work, the classification of labor employed, including names and social security numbers of laborers, labor trades used, man hours, wage rates, insurance, taxes and fringe benefits,

equipment and materials suppliers' quotations with detailed break-out and pricing, rental equipment hours and rates, and materials quantities and unit prices and such other evidence of cost as the Owner may require.

- 12.5.4.2 The Contractor shall commence submission of daily time and material tickets immediately upon commencement of the Change Order Work and continue to submit them until completion of the Change Order Work. The Owner may require authentication of all time and material tickets and invoices by persons designated by the Owner for such purpose.
- 12.5.4.3 No payment shall be made to the Contractor for any portion of the Change in the Work unless and until such daily time and material tickets and invoices are submitted. The submission of any such ticket or invoice shall not constitute an acknowledgment by the Owner that the items thereon were reasonably required for the Change in the Work.
- 12.5.4.4 For any work performed on a time and material basis, the Contractor shall submit its complete submission of the reasonable actual cost and time to perform the Change in the Work within twenty (20) days after such Work has been completed. The Owner shall review the costs and time submitted by the Contractor on the basis of reasonable expenditures and savings of those performing the Change in the Work. If such costs and time are acceptable to the Owner, or if the parties otherwise agree to the actual reasonable cost to perform the Change in the Work, a Change Order will be issued for the cost and time agreed upon. The amounts stated in the Change Order for the cost and time to perform the Change in the Work shall be binding upon the parties.

12.6 UNILATERAL CHANGE ORDER

- 12.6.1 In the event that the parties are unable to agree as to the reasonable cost and time to perform the Change in the Work and the Owner does not elect to have the Change in the Work performed on a time and material basis, the Owner may issue a unilateral Change Order based on the reasonable cost and time to perform the Change in the Work as determined by the Owner. Failure of the parties to reach agreement regarding the cost and time of performing the Change in the Work shall not relieve the Contractor from performing the Change in the Work promptly and expeditiously. Any unresolved dispute resulting from the Unilateral Change Order shall be resolved pursuant to the procedure outlined in Article 13 Claims and Dispute Procedure.

12.7 DECREASES AND WORK NOT PERFORMED (Deductive Change Orders)

- 12.7.1 Should it be deemed expedient by the Owner to decrease the dimensions, quantity of material or work, or vary in any other way the work herein contracted for, the Owner may direct by written Change Order, such decreases to be made or performed without in any way affecting the validity of the Contract. The Contractor shall, comply with the Change Order from the Owner. The difference in expense occasioned by such decrease shall be deducted from the amount payable under this Contract.
- 12.7.2 When work is deleted from the Contract by Owner, the amounts to be credited to the Owner shall reflect the same current pricing as if the work were being added to the Contract at the time the deletion is ordered, and documentation will be required for a credit as specified in Article 12.5.4. If such deleted materials and equipment shall have already been purchased and stored on site and cannot be used in other projects, returned for credit or cannot be returned for credit at the price paid by the Contractor at the time of purchase, the Contractor shall be entitled, upon proper documentation and certification, to an adjustment in the pricing of the credit to avoid hardship to the Contractor. If necessary in order to establish such reasonable value, the Contractor may be required to submit a detailed breakdown of his original bid for the items or work involved.

- 12.7.3 If work is not performed, and such deletion of work was not directed or approved by the Owner, the Owner shall ascertain the amount of the credit due.

12.8 CHANGES IN LINE AND GRADE

- 12.8.1 The Owner reserves the right to make such alterations in the line and grade of various structures or pipe lines shown on the drawings, as may be necessitated by conditions found during construction or that in the judgment of the Owner appears advisable. Such alterations shall in no way affect the validity of the Contract
- 12.8.1.1 In case of a unit price contract, if such changes increase the amount of the work or materials, the Contractor will be paid according to the quantity of work actually done at the prices established for such work under the Contract.
- 12.8.1.2 In case of a lump sum contract, the price for the work shall be determined as specified in Article 12.4 Proposed Change Order.

12.9 SUBSURFACE CONDITIONS FOUND DIFFERENT

- 12.9.1 Should the Contractor encounter subsurface and/or latent conditions at the site materially differing from those shown on the drawings or indicated in the specifications, he shall immediately give Notice to the Owner of such conditions before they are disturbed. The Owner shall thereupon promptly investigate the conditions and if he finds that they materially differ from those shown on the drawings or indicated in the specifications, he shall at once make such changes in the drawings and/or specifications as he may find necessary. Any increase or decrease of cost resulting from such changes shall be adjusted in the manner provided herein for adjustments as to extra and/or additional work and changes.

12.10 OTHER CLAIMS

If the Contractor claims that additional cost or time is involved because of, but not limited to, (1) any written interpretation pursuant to Article 2 Architect/Engineer, (2) any order by the Owner to stop the Work pursuant to Article 3 Owner where the Contractor was not at fault, (3) failure of payment by the Owner pursuant to Article 9 Payments and Completion, or (4) any written order for a minor change in the Work issued pursuant to Article 12.8. Changes in Line and Grade; the Contractor shall make such claim as provided in THIS Section 12 Changes and Modification in the Work.

ARTICLE 13 CLAIMS AND DISPUTE PROCEDURE

- 13.1 No claim shall be made under this Contract until and unless the Contractor has failed to obtain a Change Order pursuant to the previous sections of this article. The Contractor shall give the Owner written Notice of his intent to file a claim within seven (7) calendar days after rejection of his Proposed Change Order.
- 13.2 No claim shall be allowed and no amounts paid for any and all costs incurred if Notice of intent to file a claim is not given to the Owner as herein provided.
- 13.3 The complete written claim, with all supporting documentation, shall be submitted to the Purchasing Agent no later than sixty (60) days after final payment. If the claim is not disposed of by agreement, the Purchasing Agent shall reduce his decision to writing and mail or otherwise forward a copy thereof to the Contractor within thirty (30) days of receipt of the claim.

- 13.4 The Purchasing Agent's decision shall be final unless the Contractor appeals within thirty (30) days by submitting a written letter of appeal to the City Manager. The City Manager shall render a decision within sixty (60) days of receipt of the appeal.
- 13.5 No litigation shall be instituted prior to the exhaustion of the aforesaid claims process. The Contractor may not introduce factual matters in such litigation that were not set forth in the aforesaid claims process.

ARTICLE 14 UNCOVERING AND CORRECTION OF WORK

14.1 UNCOVERING OF WORK

- 14.1.1 If any portion of the Work should be covered contrary to: (1) the request of the A/E or Owner; (2) requirements specifically expressed in the Contract Documents; or (3) the requirements of applicable Construction Permits, it must, if required in writing by the Owner, be uncovered for their observation and shall be replaced at the Contractor's expense.
- 14.1.2 If any other portion of the Work has been covered which the Owner has not specifically requested to observe prior to being covered, the Owner may request to see such Work and it shall be uncovered by the Contractor. If such Work be found in accordance with the Contract Documents, the cost of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work be found not in accordance with the Contract Documents, the Contractor shall pay such costs unless it be found that this condition was caused solely by the Owner, in which event the Owner shall be responsible for the payment of such costs. If such Work be found not in accordance with the Contract Documents and the condition was caused by a separate contractor, Contractor may proceed against said separate contractor as provided in Article 6 Work by Owner or by Separate Contractors.

14.2 WARRANTY AND CORRECTION OF WORK

- 14.2.1 The Contractor guarantees and warrants to the Owner all work as follows:
- .1 That all materials and equipment furnished under this Contract will be new and the best of its respective kind unless otherwise specified;
 - .2 That all Work will be of first-class quality and free of omissions and faulty, imperfect or defective material or workmanship;
 - .3 That the Work shall be entirely watertight and leakproof in accordance with all applicable industry customs and practices, and shall be free of shrinkage and settlement which are attributable to defective materials or workmanship;
 - .4 That the Work, including but not limited to, mechanical and electrical machines, devices and equipment shall be fit and fully usable for its intended and specified purpose and shall operate satisfactorily with ordinary care;
 - .5 That consistent with requirements of the Contract Documents the Work shall be installed and oriented in such a manner as to facilitate unrestricted access for the operation and maintenance of fixed equipment; and
 - .6 That the Work will be free of abnormal or unusual deterioration which occurs because of poor quality materials or workmanship.
- 14.2.2 All Work not conforming to guarantees and warranties specified in the Contract Documents, including substitutions not properly approved and authorized, may be considered defective. If

required by the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment furnished and installed.

- 14.2.3 The Contractor shall within five (5) working days after receipt of written Notice from the Owner during the performance of the Work, reconstruct, replace or correct all Work rejected by the A/E or Owner as defective, as failing to conform to the Contract Documents, or as not in accordance with the guarantees and warranties specified in the Contract Documents whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of reconstructing, replacing or correcting such rejected Work, including compensation for the A/E's additional services made necessary thereby.
- 14.2.4 If, within one (1) year after the Date of Substantial or Final Completion of the Work or designated portion thereof or within one (1) year after acceptance by the Owner of designated equipment or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be defective, not in accordance with the Contract Documents, or not in accordance with the guarantees and warranties specified in the Contract Documents, the Contractor shall correct it within five (5) working days after receipt of a written Notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition pursuant to 14.3 Acceptance of Faulty, Defective or Non-Conforming Work. This obligation shall survive termination of the Contract. The Owner shall give such Notice promptly after discovery of the condition.
- 14.2.5 Subject to limitation as prescribed by law, if at any time deficiencies in the Work are discovered which are found to have resulted from fraud or misrepresentation, or an intent or attempt to defraud the Owner by the Contractor, any Subcontractor or Supplier, the Contractor will be liable for replacement or correction of such Work and any damages which Owner has incurred related thereto, regardless of the time limit of any guarantee or warranty.
- 14.2.6 Any materials or other portions of the Work, installed, furnished or stored on site which are not of the character or quality required by the specifications, or are otherwise not acceptable to the Owner, shall be immediately removed and replaced by the Contractor to the satisfaction of the Owner, when notified to do so by the Owner.
- 14.2.7 If the Contractor fails to correct defective or nonconforming Work as required by Articles 13.2.3 and 13.2.4, or if the Contractor fails to remove defective or nonconforming Work from the site, as required by Article 13.2.6, the Owner may elect to either correct such Work in accordance with Article 3.5 Owner's Right to carry out the Work or remove and store materials and equipment at the expense of the Contractor. If the Contractor does not pay the cost of such removal and storage within ten (10) days thereafter, the Owner may upon ten additional days written Notice sell such Work at auction or at public or private sale and shall account for the net proceeds thereof, after deducting all the costs that should have been borne by the Contractor, including compensation for the A/E's additional services made necessary thereby. If such proceeds of sale do not cover all costs that the Contractor should have borne, the difference shall be charged to the Contractor and an appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.
- 14.2.8 The Contractor shall bear the cost of making good all work of the Owner, separate contractors or others, destroyed or damaged by such correction or removal required under this Article.

14.3 ACCEPTANCE OF FAULTY, DEFECTIVE OR NON-CONFORMING WORK

If the Owner prefers to accept faulty, defective or nonconforming Work, he may do so instead of requiring its removal and correction, in which case a Change Order will be issued at Owner's option, to reflect a reduction in the Contract Sum in an amount to be determined by the Owner.

ARTICLE 15 TERMINATION OF THE CONTRACT

15.1 CONTRACTOR'S RIGHT TO STOP WORK OR TERMINATE CONTRACT

If the Work should be stopped under an order of any court or other public authority for a period of ninety (90) days through no fault of the Contractor or anyone employed by him, or if the Owner should fail to pay to the Contractor within thirty (30) days any sum certified by the Architect/Engineer when no dispute exists as to the sum due or any provision of the Contract, then the Contractor may, upon ten (10) calendar days written Notice to the Owner, stop Work or terminate the Contract and recover from the Owner payment for the cost of the Work actually performed, together with overhead and profit thereon, but profit on the Work performed shall be recovered only to the extent that the Contractor can demonstrate that he would have had profit on the entire Contract if he had completed the Work. The Contractor may not receive profit or any other type of compensation for parts of the Work not performed. The Contractor may recover the reasonable cost of physically closing down the Site, but no other costs of termination. The Owner may offset any claims it may have against the Contractor against the amounts due to the Contractor. In no event shall termination of the Contract by the Contractor terminate the obligations of the Contractor's surety on its payment and performance bonds.

15.2 OWNER'S RIGHT TO TERMINATE CONTRACT FOR CAUSE

- 15.2.1 If the Contractor should be adjudged as bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, the Owner may terminate the Contract. If the Contractor should refuse or should repeatedly fail, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials and equipment, or if he should fail to make prompt payment to subcontractors or suppliers of material of labor, or if he should disregard laws, ordinances or the written instructions of the Architect/Engineer or the Owner, or otherwise be in substantial violation of any provision of the Contract, then the Owner may terminate the Contract.
- 15.2.2 Prior to termination of the Contract, the Owner shall give the Contractor and his surety ten (10) calendar days written Notice during which the Contractor and/or his surety may rectify the basis for the notice. If rectified to the satisfaction of the Owner within said ten (10) days, the Owner may rescind its notice of termination. If not, the termination for cause shall become effective at the end of the ten (10) day notice period. In the alternative, the Owner may, in writing, postpone the effective date of the termination for cause, at its sole discretion, if it should receive reassurances from the Contractor and/or its surety that the basis for the termination will be remedied in a time and manner which the Owner finds acceptable. If at any time after such postponement, the Owner determines that Contractor and/or its surety has not or is not likely to rectify the causes of termination in an acceptable manner or within the time allowed, then the Owner may immediately terminate the Contract for cause, without the necessity of further ten (10) day notice, by notifying the Contractor and his surety in writing of the termination. In no event shall termination for cause terminate the obligations of the Contractor's surety on its payment and performance bonds.
- 15.2.3 Upon termination of the Contract, the Contractor shall immediately cease work and the Owner shall take possession of the Site and of all materials, tools and equipment thereon and finish the Work by whatever method he may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the Owner has finally completed the project through

its own resources or those of a subsequent contractor. If the expense of finishing the Work, including compensation for additional design, managerial and administrative services, shall exceed the unpaid balance of the Contract Price, the Contractor shall pay the difference to the Owner, together with any other expenses of terminating the Contract and having it completed by others. If the unpaid balance of the Contract Price exceeds the costs of finishing the Work, including compensation for additional design, managerial and administrative services, such excess shall be paid to the Contractor.

- 15.2.4 If it should be judicially determined that the Owner improperly terminated this Contract for cause, then the termination shall be deemed to be a termination for the convenience of the Owner.
- 15.2.5 Termination of the Contract under this Section is without prejudice to any other right or remedy of the Owner.

15.3 OWNER'S RIGHT TO TERMINATE CONTRACT FOR CONVENIENCE

- 15.3.1 Owner may terminate this Contract, in whole or in part, at any time without cause upon giving the Contractor written Notice of such termination. Upon such termination, the Contractor shall immediately cease Work and remove from the Site all of its labor forces and such of its materials as Owner elects not to purchase or to assume in the manner hereinafter provided. Upon such termination, the Contractor shall take such steps as Owner may require to assign to the Owner the Contractor's interest in all Subcontracts and purchase orders designated by Owner. After all such steps have been taken to Owner's satisfaction, the Contractor shall receive as full compensation for termination and assignment the following:
 - (1) Amounts due for Work performed in accordance with the Contract through the date of termination.
 - (2) Reasonable compensation for the actual cost of demobilization incurred by the Contractor as a direct result of such termination. The Contractor shall not be entitled to any compensation or damages for lost profits or for any other type of contractual compensation or damages other than those provided by the preceding sentence. Upon payment of the foregoing, Owner shall have no further obligations to Contractor of any nature.
- 15.3.2 In no event shall termination for the convenience of the Owner terminate the obligations of the Contractor's surety on its payment and performance bonds.
- 15.3.3 After receipt of a Notice of Termination, the Contractor shall submit to the Owner his termination claim. Such claim shall be submitted promptly but in no event later than forty-five (45) days from the effective date of termination. Upon failure of the Contractor to submit his termination claim within the time allowed, the Owner may determine, on the basis of information available to him, the amount, if any, due to the Contractor by reason of the termination.

15.4 CONTRACTOR'S RESPONSIBILITIES UPON TERMINATION

- 15.4.1 After receipt of a Notice of Termination pursuant to 15.3 Owner's Right to Terminate Contract for Convenience the Contractor shall mitigate any damages to the extent reasonably possible.
- 15.4.2 In addition to the provisions of 15.4.1, the Contractor shall:
 - .1 At the option of the Owner, assign to the Owner, in the manner, at the time, and to the extent directed by the Owner, all of the right, title, and interest of the Contractor under the orders and subcontracts so terminated, in which case the Owner shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts;

- .2 Transfer title and deliver to the Owner in the manner, at the times, and to the extent, if any, directed by the Owner:
 - a) The fabricated or unfabricated parts, work in process, completed Work, supplies, and other material procured as a part of, or acquired in connection with the performance of the Work terminated by the Notice of Termination, and
 - b) The completed or partially completed drawings, releases, information, manuals and other property which, if the Contract had been completed, would have been required to be furnished to the Owner;
- .3 Complete performance of such part of the Work as shall not have been terminated by the Notice of Termination; and
- .4 Take such action as may be necessary, or as the Owner may direct, for the protection and preservation of the property related to this Contract which is in the possession of the Contractor and in which the Owner has or may acquire an interest.

15.5 DISPUTES UPON TERMINATION

- 15.5.1 The provisions of 13.0 Claims and Dispute Procedures shall be applicable to any claim, dispute or other matter arising because of termination under this Article 15.

DIVISION 16

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SECTION 02831

CHAIN LINK FENCES AND GATES

PART 1- GENERAL

1.1 SUBMITTALS

- A. Product data including manufacturer's technical data, specifications, and installation instructions.

PART 2 - PRODUCTS

2.1 FABRIC

- A. Comply with Chain Link Fence Manufacturers Institute (CLFMI) "Product Manual" with 2-inch mesh of 0.148-inch-diameter (9-gage), galvanized (zinc coated) steel wire.
- B. Fabric shall be 7'-0" high.

2.2 PIPE

- A. Type: Standard weight (Schedule 40) galvanized steel pipe conforming to ASTM F 1083, according to heavy industrial requirements of ASTM F699, Group 1A, with minimum yield strength of 25,000 psi, not less than 1.8 ounce of zinc per square foot. Type A coating inside and outside according to ASTM F1234, as determined by ASTM A90. Weight per foot shall be as follows:

<u>Actual OD</u>	<u>Weight (lb/ft)</u>	<u>NPS Size</u>
1.660	2.27	1-1/4
1.900	2.72	1-1/2
2.375	3.65	2
2.875	5.79	2-1/2

2.3 POSTS AND RAILS

- A. Top rail: 1.66-inch OD pipe.
- B. Line or Intermediate Posts: 2.375-inch OD pipe.
- C. End, Corner, and Pull Posts: 2.875-inch OD pipe.
- D. Swing Gate Posts: 2.875-inch OD pipe.
- E. Fittings and Accessories: Comply with ASTM F 626.

- F. Post and Line Caps: Provide weathertight cap for each post. Provide line post caps with loop to receive tension wire or top rail.
- G. Post Brace Assembly: Same material as top rail with 3/8-inch-diameter rod and adjustable tightener.
- H. Center Rail: Same material as top rail with cap on each end.
- I. Tension or Stretcher Bars: Galvanized steel bar, 2 inches shorter than fabric height, 3/16 inch thick by 3/4 inch wide.
- J. Tension and Brace Bands: 3/4-inch-wide galvanized-steel bands.
 - 1. Tension Bands: 0.074 inch thick (14 gage).
 - 2. Brace Bands: 0.105 inch thick (12 gage).
- K. Tension Wire: 0.177-inch-diameter metallic-coated steel marcelled tension wire with finish to match fabric.
- L. Tie Wires: 0.106-inch-diameter (12-gage) galvanized steel or 0.148-inch-diameter (9-gage) aluminum alloy wire to match fabric wire.

2.4 SWING GATES

- A. Comply with ASTM F 900.
- B. Fabric: Same as fence.
- C. Frames: 1.90-inch OD pipe.
- D. Hardware: Provide galvanized hardware and accessories for each gate according to the following:
 - 1. Hinges: Non-lift-off type, offset to permit 180-degree gate opening.
 - 2. Latch: Forked type or plunger-bar type with padlock eye.
 - 3. Keeper: Provide a keeper for vehicle gates that automatically engages gate leaf and holds it in the open position until manually released.
 - 4. Gate Stops: Provide gate stops set in concrete for double gates, designed to engage a center drop rod or plunger bar. Include a locking device permitting both gate leaves to be locked with a single padlock.

2.5 BARBED WIRE

- A. Barbed Wire Supporting Arms: Manufacturer's standard barbed wire supporting arms conforming to ASTM F 626, metal and finish to match fence framework, with provision for anchorage to posts and attaching three rows of barbed wire to each arm. Supporting

arms may be either attached to posts or integral with post top weather cap and must be capable of withstanding 250-lb downward pull at outermost end. Provide following type:

- B. Single 45-degree arm for three strands of barbed wire, one for each post.
- C. Steel Barbed Wire: Two-strand, 0.099-inch-diameter (12-1/2-gage) steel wire with 0.080-inch-diameter (14-gage), four-point barbs spaced not more than 5 inches o.c.. Finish shall be galvanized complying with ASTM A 121, chain link fence grade with Class 3 coating with not less than 0.8 oz. of zinc per sq. ft. as determined by ASTM A 90.

2.6 Epoxy grout shall be Sika Corporation, Sikadur 35, H:-ModLV.

PART 3 - EXECUTION

3.1 INSTALLATION: Install fence to comply with ASTM F 567. Do not begin installation and erection before final grading is completed, unless otherwise permitted. Apply fabric to outside of framework.

3.2 EXCAVATION

- A. Drill postholes to diameters and spacings indicated.
- B. Excavate post hole diameter to four times the largest cross section of post and hole depth, approximately 3 inches below bottom of posts, with bottom of posts set not less than 36 inches below finish grade surface.

3.3 SETTING POSTS

- A. Center and align posts in holes 3 inches above bottom of excavation.
- B. Space posts not more than 10 feet o.c.
- C. Align posts vertically and align tops.
- D. Extend concrete footings 2 inches above grade and trowel to a crown to shed water.
- E. Setting Posts:
 - 1. Set posts in sleeves provided in concrete slab.
 - 2. Fill voids between post and inside of sleeve with epoxy grout.
- F. Top Rails: Run rail continuously through line post caps with expansion couplings as recommended by fencing manufacturer.
- G. Brace Assemblies: Install braces at end and gate posts and at both sides of corner and pull posts so posts are plumb when diagonal rod is under proper tension.
- H. Bottom Tension Wire: Install within 6 inches of bottom of fabric and tie to each post. Fasten to fabric with 0.120-inch-diameter (11-gage) hog rings spaced not more than 24 inches o.c.

- I. Fabric: Install fabric on security side of fence with approximately 2 inches between finish grade and bottom selvage and anchor to framework so that fabric remains under tension after pulling force is released.
- J. Tension or Stretcher Bars: Thread through fabric and secure bars to end, corner, pull, and gate posts with tension bands spaced not over 15 inches o.c.
- K. Tie Wires: Use to secure fabric to posts and rails. Tie fabric to line posts 12 inches o.c. and to rails and braces not more than 24 inches o.c.
- L. Barbed Wire: Pull wire taut and install securely to extension arms and secure to end post or terminal arms according to manufacturer's instructions.
- M. Gates: Install gates according to manufacturer's instructions, plumb, level, and secure for full opening without interference.

END OF SECTION 02831

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

- 1.01 SUBMITTALS: Submit the following: Product data for reinforcement, forming accessories, admixtures, and curing compounds.

Shop drawings for fabricating, bending, and placing concrete reinforcement.

Laboratory test reports or evaluation reports for concrete materials and concrete mix designs.

PART 2 - PRODUCTS

- 2.01 FORM MATERIALS: Furnish form materials with sufficient stability to withstand pressure of placed concrete without bow or deflection.

A. Forms for Exposed Concrete Surfaces: Suitable panel-type material to provide continuous, straight, smooth, exposed surfaces.

- 2.02 REINFORCING MATERIALS: As follows:

A. Deformed Reinforcing Bars: ASTM A 615, Grade 60, unless otherwise indicated.

- 2.03 CONCRETE MATERIALS: As follows:

A. Portland Cement: ASTM C 150, Type 1.

B. Fly Ash: ASTM C 618, Type F.

C. Aggregates: ASTM C 33, except local aggregates of proven durability may be used when acceptable to Architect.

D. Water: Potable.

- 2.04 ADMIXTURES: Provide admixtures that contain not more than 0.1 percent chloride ions.

A. Air-Entraining Admixture: ASTM C 260.

B. Water-Reducing, Retarding, and Accelerating Chemical Admixtures: ASTM C 494.

- 2.05 RELATED MATERIALS: As follows:

A. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

B. Moisture-Retaining Cover: Waterproof paper, polyethylene film, or polyethylene-coated burlap, complying with ASTM C 171.

- C. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.
- 2.06 MIX PROPORTIONS AND DESIGN: Proportion mixes complying with mix design procedures specified in ACI 301.
- A. Limit use of fly ash to not exceed 25 percent of cement content by weight.
 - B. Design mixes to provide normal weight concrete with the following properties:
 - 1. 4000-psi, 28-day compressive strength; water-cement ratio, 0.44 maximum (non-air-entrained), 0.35 maximum (air-entrained).
 - C. Limit maximum water-cement ratio of concrete exposed to freezing and thawing to 0.45. Limit maximum water-cement ratio of concrete exposed to deicing salts, brackish water, or seawater to 0.40.
 - D. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
 - 1. Ramps, Slabs, and Sloping Surfaces: Not more than 3 inches.
 - 2. Reinforced Foundation Systems: Not less than 1 inch and not more than 3 inches.
 - 3. Other Concrete: Not more than 4 inches.
 - E. Adjust mix designs when material characteristics, job conditions, weather, test results, or other circumstances warrant. Do not use revised concrete mixes until laboratory test data and strength results have been submitted to and reviewed by Architect.
- 2.07 Use air-entraining admixture in exterior exposed concrete, providing not less than 4.5 percent nor more than 7 percent entrained air for concrete exposed to freezing and thawing, and from 2 percent to 4 percent for other concrete.
- 2.08 Use water-reducing, accelerating, and retarding admixtures that have been tested and accepted in mix designs in strict compliance with manufacturer's directions.
- 2.09 Job-Site Mixing: Use drum-type batch machine mixer, mixing not less than 1-1/2 minutes for 1 cu. yd. or smaller capacity. Increase mixing time at least 15 seconds for each additional cu. yd.
- 2.10 Ready-Mix Concrete: ASTM C 94.

PART 3 - EXECUTION

- 3.01 CONSTRUCT GENERATOR PAD as recommended by generator manufacturer and per the VUSBC for the seismic zone in which the project is located.
- 3.02 FORMWORK: Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation, and position. Select form materials to obtain required finishes.
-

- A. Maintain formwork tolerances and surface irregularities within ACI 347 limits, Class A tolerances for concrete exposed to view and Class C tolerances for other concrete surfaces.
 - B. Provide openings in formwork to accommodate work of other trades. Accurately place and securely support items built into forms.
 - C. Clean and adjust forms prior to concrete placement. Apply form-release agents or wet forms as required. Retighten forms during concrete placement, if required, to eliminate mortar leaks.
- 3.03 REINFORCEMENT: Accurately position and support reinforcement, and secure against displacement. Locate and support reinforcement to maintain minimum cover with metal chairs, runners, bolsters, spacers, and hangers as required. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- 3.04 JOINTS: Locate and install construction, isolation, and control joints as indicated or required. Locate construction joints so they do not impair strength and appearance of structure. Place isolation and control joints in slabs-on-ground to stabilize differential settlement and prevent random cracking.
- 3.05 CONCRETE PLACEMENT: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," for placing concrete in a continuous operation within planned joints or sections. Do not begin concrete placement until other affected work is completed.
- A. Consolidate placed concrete using mechanical vibrating equipment with hand rodding and tamping so that concrete is worked around reinforcement and other embedded items and into forms.
 - B. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placing, and curing.
 - 1. In cold weather comply with ACI 306.
 - 2. In hot weather comply with ACI 305.
- 3.06 MONOLITHIC SLAB FINISHES: As follows:
- A. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish when surface water has disappeared and when concrete has stiffened sufficiently to permit operation of power-driven floats. Consolidate surface with power-driven floats or by hand-floating.
 - 1. Check and level surface plane to tolerances of F(F) 18 (floor flatness) and F(L) 15 (floor levelness). Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

- B. Nonslip Broom Finish: Apply nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route.
- 3.07 CURING: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather, apply an evaporation-control compound according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
- A. Begin initial curing as soon as free water has disappeared from exposed surfaces.
 - B. Continue curing unformed concrete surfaces by water ponding, continuous fog spraying, continuously wetted absorptive cover, or by moisture-retaining cover curing. Cure formed surfaces by moist curing until forms are removed. Keep concrete continuously moist for not less than 72 hours for high- early strength concrete and 7 days for all other concrete.

END OF SECTION 03300

SECTION 16010

ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

- A. Each Section within Division 16 - Electrical, shall conform to the requirements of the General Conditions of the Contract, including Supplementary General Conditions, Special Conditions, and all requirements of Division 1.
- B. Each Section within Division 16 - Electrical, shall conform to the additional requirements of this Section, Electrical General Provisions.

1.2 REFERENCE STANDARDS

- A. Material, equipment and installation shall meet requirements of applicable codes and standards listed below. Electrical material and equipment shall bear the UL label except where UL does not label such types of material and equipment.
- B. Reference standards are referred to by abbreviation as follows:
 - 1. American National Standards Institute ----- ANSI
 - 2. American Society for Testing and Materials ----- ASTM
 - 3. National Electrical Code (NFPA No. 70) ----- NEC
 - 4. National Electrical Manufacturers Association ----- NEMA
 - 5. National Electrical Testing Association ----- NETA
 - 6. National Fire Protection Association ----- NFPA
 - 7. Underwriters Laboratories, Inc. ----- UL
 - 8. Virginia Uniform State Building Code----- USBC

- 1.3 RECORD DRAWINGS: Maintain a dedicated set of drawings on the jobsite and mark all variations taken to the Contract Drawings.

1.4 INTENT OF DRAWINGS AND SPECIFICATIONS

- A. The implied and stated intent of the drawings and specifications is to establish minimum acceptable quality standards for materials, equipment and workmanship, and to provide an operable electrical system complete in every respect.
- B. The drawings are diagrammatic, intending to show general arrangement and location of system components, and are not intended to be rigid in detail.

- C. Due to the small scale of the drawings, and to unforeseen job conditions, all required offsets and fittings may not be shown but shall be provided at no change in Contract Price.

1.5 SUBMITTALS

- A. Submit Shop Drawings in accordance with the General Conditions and Supplementary Conditions.
- B. Shop Drawings shall be presented in a clear and thorough manner.
- C. Prepare shop drawings as follows:
 - 1. Clearly mark each copy to identify pertinent products or models.
 - 2. Show performance characteristics and capacities.
 - 3. Show dimensions and clearances required.
 - 4. Show wiring diagrams and controls.
- D. Manufacturer's standard schematic drawings and diagrams:
 - 1. Modify drawings and diagrams to delete information which is not applicable to the work.
 - 2. Supplement standard information to provide information specifically applicable to the work.
- E. The Contractor shall:
 - 1. Review Shop Drawings prior to submission.
 - 2. Determine and verify:
 - a. Field measurements.
 - b. Field construction criteria.
 - c. Catalog numbers and similar data.
 - d. Conformance with specifications.
 - 3. Coordinate each submittal with requirements of the work and of the Contract Documents.
 - 4. Notify the Engineer in writing, at time of submission, of any deviations in the submittals from requirements of the Contract Documents.

5. Begin no fabrication or work which requires submittals until return of submittals with Engineer approval.
 6. Make submittals promptly in accordance with approved schedule, and in such sequence as to cause no delay in the work or in the work of any other trade.
- F. Unless required otherwise by the General Conditions, or the Supplementary Conditions, submit the number of opaque reproductions which the Contractor requires, plus two copies which will be retained by the Engineer.
- G. Submittals shall contain:
1. The date of submission and the dates of any previous submissions.
 2. The Project title and number.
 3. Contract identification.
 4. The names of:
 - a. Contractor.
 - b. Supplier.
 - c. Manufacturer.
 5. Identification of the product, with the specification section number.
 6. Field dimensions, clearly identified as such.
 7. Relation to adjacent or critical features of the work or materials.
 8. Applicable standards.
 9. Identification of deviations from Contract Documents.
 10. Identification of revisions on resubmittals.
 11. Copy of Shop Drawing Review Stamp Sheet as found in Paragraph 4 of this Section with Electrical Contractor's section executed certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the work and of Contract Documents.
 12. Each submittal shall be limited to a single specification section. Submittals shall not be grouped with other sections in common binders or under common control sheets. Each submittal shall have a cover/control sheet containing the information listed above (1 thru 11).

- 13. Submittals which do not comply with these requirements may be returned with no action taken at the reviewer's discretion.
- H. The Contractor shall distribute approved samples per Division 1 - General Requirements.
- I. Submit shop drawings for the following identified by section number and product name:
 - 16420 - Electric Service
 - 16440 - Safety Switches
 - 16450 - Grounding
 - 16470 - Panelboards
 - 16475 - Molded Case Circuit Breakers (MCCB)
 - 16480 - Motor Starters
 - 16617 - Surge Suppressors
 - 16620 - Emergency Standby Power System
 - 16625 - Emergency Standby Power Automatic Transfer Switch (ATS)
- 1.6 CUTTING AND PATCHING: Shall be done in a workmanlike manner using tools and materials suitable for the purpose.
- 1.7 OPERATING AND MAINTENANCE DATA
 - A. Compile product data and related information appropriate for Owner's maintenance and operation of products furnished under Contract.
 - B. Instruct Owner's personnel in maintenance of products and in operation of equipment and systems.
 - C. Preparation of data shall be done by personnel:
 - 1. Trained and experienced in maintenance and operation of described products.
 - 2. Familiar with requirements of this Section.
 - 3. Skilled as technical writer to the extent required to communicate essential data.
 - 4. Skilled as draftsman competent to prepare required drawings.
 - D. Prepare data in form of an instructional manual for use by Owner's personnel.
 - E. Format:
 - 1. Size: 8 1/2 in. x 11 in.
 - 2. Paper: 20 pound minimum, white, for typed pages.
 - 3. Text: Manufacturer's printed data, or neatly typewritten.

4. Drawings:
 - a. Provide reinforced punched binder tab, bind in with text.
 - b. Fold larger drawings to size of text pages.
 5. Provide fly-leaf for each separate product, or each piece of operating equipment.
 - a. Provide typed description of product, and major component parts of equipment.
 - b. Provide indexed tabs.
 6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:
 - a. Title of Project.
 - b. Identity of separate structure as applicable.
 - c. Identity of general subject matter covered in the manual.
- F. Binders:
1. Commercial quality three-ring binders with durable and cleanable plastic covers.
 2. Minimum ring size: 1 inch.
 3. When multiple binders are used, correlate the data into related consistent groupings.
- G. Manual shall contain a neatly typewritten table of contents for each volume, arranged in systematic order.
1. Contractor, name of responsible principal, address and telephone number.
 2. A list of each product required to be included, indexed to content of the volume.
 3. List, with each product, name, address and telephone number of:
 - a. Subcontractor or installer.
 - b. Maintenance contractor, as appropriate.
 - c. Identify area of responsibility of each.
 - d. Local source of supply for parts and replacement.
 4. Identify each product by product name and other identifying symbols as set forth in Contract Documents.

- H. Product Data:
 - 1. Include only those sheets which are pertinent to the specific product.
 - 2. Annotate each sheet to:
 - a. Clearly identify specific product or part installed.
 - b. Clearly identify data applicable to installation.
 - c. Delete references to inapplicable information.
- I. Drawings:
 - 1. Supplement product data with drawings as necessary to clearly illustrate:
 - a. Relations of component parts of equipment and systems.
 - b. Control and flow diagrams.
 - 2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
 - 3. Do not use Project Record Documents as maintenance drawings.
- J. Written text, as required to supplement product data for the particular installation:
 - 1. Organize in consistent format under separate headings for different procedures.
 - 2. Provide logical sequence of instructions for each procedure.
- K. Copy of each warranty, bond and service contract issued.
 - 1. Provide information sheet for Owner's personnel, give:
 - a. Proper procedures in event of failure.
 - b. Instances which might affect validity of warranties or bonds.
- L. Submit two copies of complete manual in final form.
- M. Submit operating and maintenance data on the following:
 - 16620 - Emergency Standby Power System
 - 16625 - Emergency Standby Power Automatic Transfer Switch (ATS)

PART 2- PRODUCTS

2.1 NAMEPLATES

A. Material:

1. Equipment nameplates shall be constructed of laminated phenolic with a black center core sandwiched between white layers.
2. Warning nameplates shall be constructed of laminated phenolic with a white center core sandwiched between red layers.

B. Inscription: Letters shall be engraved in the phenolic to form letters 3/8 inches high, unless indicated otherwise on drawings.

C. Fasteners shall be screws or a nonadhesive type fastener.

PART 3 - EXECUTION

- 3.1 All electrical work shall be performed by or under the direct supervision of a master electrician licensed to work in the project location.
- 3.2 Provide equipment connections complete with protective devices, wiring, and other accessories. All equipment and connections shall be as recommended by the manufacturer or as indicated on drawings or required by specifications.
- 3.3 Mount on each piece of equipment, a nameplate descriptive of the equipment or equipment controlled.
- 3.4 When equipment is supplied with electrical requirements other than those specified or shown on the drawings, associated electrical devices and circuitry of the correct sizes and ratings shall be provided.
- 3.5 Instruct Owner personnel in proper operation and maintenance of equipment.

PART 4.0 - SHOP DRAWING REVIEW STAMP SHEET

- 4.1 See following page.

ELECTRICAL CONTRACTOR'S SHOP DRAWING REVIEW	
PROJECT NO.:	
PROJECT NAME: Carroll Avenue Pump Station Generator	
SPECIFICATION SECTION	
APPROVED <input type="checkbox"/>	APPROVED AS NOTED <input type="checkbox"/>
ELECTRICAL CONTRACTOR'S COMPANY NAME: _____	
By: _____ Date: _____	

ENGINEER'S SHOP DRAWING REVIEW	
PROJECT NO.: 262-162-A	
PROJECT NAME: Carroll Avenue Pump Station Generator	
SPECIFICATION SECTION	
APPROVED <input type="checkbox"/>	APPROVED AS NOTED <input type="checkbox"/>
NOT APPROVED <input type="checkbox"/>	REVISE & RESUBMIT <input type="checkbox"/>
Approval is only for conformance with the design concept of the project and compliance with the information given in the Contract Documents. Contractor is responsible for dimensions to be confirmed and correlated at the job site; for information that pertains solely to the fabrication process or to techniques of construction; and for coordination of the work of all trades.	
Master Engineers and Designers, P.C.	
By: _____ Date: _____	

END OF SECTION 16010

16020

COORDINATION

PART 1 - GENERAL

1.1 ELECTRICAL GENERAL PROVISIONS

- A. Provisions of Section 16010 - Electrical General Provisions shall be made an integral part of this section.

1.2 DESCRIPTION

- A. Reasonable design effort has been made to coordinate the trades involved. Field coordination shall be the responsibility of all subcontractors on this project. Coordinate all portions of electrical work with that of other trades.

1.3 QUALITY ASSURANCE

- A. Arrange equipment substantially as shown on the drawings. Make deviations only where necessary to avoid interference. Check equipment size against available space prior to shipment to avoid interference.

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION

- 3.1 Because equipment supplied may have connection points different than shown on the drawings, locate conduit runs and locations of disconnects, control stations and the like based upon shop drawings of the associated equipment.
- 3.2 Where conflicts occur, bring to attention of the Engineer for resolution. Make adjustments as directed at no additional cost.
- 3.3 In all cases, locate equipment so that working clearances, clear space, access to equipment and headroom conforms to the requirements of National Electrical Code paragraphs 110-26 and 110-34.

END OF SECTION 16020

SECTION 16030

REWORKING EXISTING SYSTEM

PART 1- GENERAL

1.1 ELECTRICAL GENERAL PROVISIONS

- A. Provisions of Section 16010 - Electrical General Provisions shall be made an integral part of this section.

1.2 DESCRIPTION

- A. Make indicated changes to existing facilities and equipment. Where indicated changes to nonelectrical facilities require minor associated electrical changes, these changes shall be accomplished even if not specifically indicated.
- 1.3 Provide material and labor necessary for temporary electrical facilities required to maintain facility in full operation for the duration of the project.

PART 2 - PRODUCTS

- 2.1 Products shall be new and as specified in this Division unless reuse of existing facilities is specifically indicated on the drawings.

PART 3 - EXECUTION

3.1 PROTECTION OF EXISTING PREMISES

- A. Protect the existing premises, including the buildings, grounds and appurtenances, from damage which might be done or caused by work performed under this DIVISION. Repair damage so as to restore the damaged areas to their original condition.
- B. Provide protective materials and coverings where necessary, to guard building surfaces and building contents from damages due to the operations of this work.

3.2 MAINTENANCE OF EXISTING PREMISES

- A. During the execution of the work of this DIVISION the Owner will continue to occupy the existing building and will therefore require continuous operation of all existing facilities. Schedule outages required for construction purposes for the shortest practical periods of time, and then only by pre-arrangement with the Owner for specific, mutually agreeable periods, after each of which the interruption shall cease and service shall be restored.
- B. Perform work under this DIVISION in such a manner as to cause the least amount of interruption of existing services to the occupied spaces.

- C. Outages required to be performed outside of normal working hours in order to meet the project schedule shall be performed without additional cost to the Owner.

3.3 MAINTENANCE OF EXISTING FACILITIES

- A. Perform all work, including any alterations or modifications to the existing system, as may be necessary to provide a complete and usable facility in accordance with the design concept and as shown on the drawings.
- B. Perform alterations to existing electrical work as indicated on the drawings. Where making provisions to provide for continuous service, rewire subject outlets, devices and circuits in accordance with good workmanship by rerouting conduits, wiring and relocating devices and equipment to new locations as a part of the work to be performed under this DIVISION. In the removal of those outlets, devices or circuits that are not to be retained, remove all portions of such circuits in their entirety where possible. Where they are completely inaccessible, they may be abandoned, provided that the circuits, devices or equipment have been disconnected and de-energized from all power sources.

3.4 ELECTRICAL DEMOLITION

- A. Disconnect and remove all electrical materials and equipment within the construction limits indicated to be removed.
- B. Coordinate all phasing of demolition work with the Owner's representative to minimize interruption of power and the functioning of surrounding spaces.
- C. Disconnect and remove cable and conduit to equipment being removed.
- D. Cut back exposed portions of abandoned, concealed conduit to facilitate patching.
- E. See related paragraphs of this SECTION and other DIVISIONS for additional requirements.
- F. Dispose of removed equipment and material.
- G. Update nameplates of equipment from which circuits have been modified or disconnected.

- 3.5 Thoroughly inspect electrical systems in reworked areas and bring to the attention of the Engineer all defective or unserviceable material not scheduled for removal or replacement.

END OF SECTION 16030

SECTION 16040

TESTING AND PLACING IN SERVICE

PART 1 - GENERAL

1.1 ELECTRICAL GENERAL PROVISIONS

- A. Provisions of Section 16010 - Electrical General Provisions shall be made an integral part of this section.

1.2 WORK INCLUDES

- A. Provide all material, equipment, labor, and technical supervision to perform and complete the electrical acceptance tests in accordance with the requirements of this section for equipment installed as the work of this contract. Notify Engineer at least 7 working days in advance of tests.
- B. Perform tests on the following equipment:
 - 1. Grounding
 - 2. Motors
 - 3. Generators
 - 4. Transfer Switch
 - 5. Receptacles

1.3 REFERENCES

- A. NETA ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems

1.4 SUBMITTALS

- A. Prior to beginning testing, submit for Engineer review, an outline of the test program for each piece of equipment. The form shall include the following information:
 - 1. Name of equipment and location within the facility
 - 2. Manufacturer and catalog number of the equipment
 - 3. Drawing number of the equipment
 - 4. Date of the test
 - 5. Time of the test

6. Temperature, degrees F
 7. Relative humidity, percent
 8. List of testing devices used (manufacturer and catalog number shall be shown)
 9. The test program for each individual piece of equipment, preferably in tabulation form
 10. Failures: Describe each failure in detail and the corrective measures taken. If no failures were observed, write "None "
 11. Certify readiness of the equipment for service
 12. Date, printed name, and signature of a person conducting the test and name of the person's employer
 13. Printed name, signature, name of the company of a person responsible for the start-up.
- B. Records of all tests and inspections, with complete data on all readings taken, shall be made and incorporated into a legible report. Four bound copies of all test reports shall be delivered to Engineer at the end of test period.
- 1.5 QUALITY ASSURANCE: Final acceptance will depend upon successful completion of specified testing.
- 1.6 Perform all tests in accordance with manufacturer's recommendations. Should manufacturer's recommendations conflict with these specifications, notify Engineer. Do not proceed with tests until directed by Engineer.
- 1.7 Material or equipment failing tests shall be repaired or replaced at the Contractor's expense.
- 1.8 The Contractor shall be responsible for all tests and test records. Testing shall be performed by or under the immediate supervision of the Contractor.
- 1.9 Inspect the equipment prior to energizing.
- 1.10 Notify vendors of equipment and invite the vendor to witness the test on equipment being tested under this specification. Extend reasonable cooperation to permit witnessing by a representative of the vendor of the equipment under test should the vendor so request.

PART 2- PRODUCTS

- 2.1 The Contractor shall employ, as a minimum, the testing devices listed below and personnel trained in their use. Items in parenthesis shall be maintained on the job site for the duration of the project.
- A. Phase sequence and motor rotation indicator: Amprobe Model PRM01, or equal.

- B. Megohmmeter: Amprobe Model Series AMB, or equal.
- C. Ground tester: Amprobe Model GP-1, or equal.
- D. Power-line disturbance analyzer: Dranetz Series 606.
- E. Resistance / inductance load bank
- F. Receptacle polarity tester: Bryant 5266PT, or equal.

PART 3 – EXECUTION

3.1 GENERAL

- A. The insulation tests (megger tests) as specified in this section are the minimum readings desired at an ambient temperature of 60 degrees F and a low relative humidity. Megger readings taken at other than ambient temperature of 60 degrees F shall be corrected to 60 degrees F. When megger readings fall below the specified minimum values, utilize recognized means to dry out the equipment. The method utilized by the Contractor must be in accordance with manufacturer's written instructions. If drying is to be done by applying an electric potential to a piece of equipment, then, in no case, induced or direct, shall the voltage or current exceed the continuous rating of the equipment being dried.

3.2 GROUNDING

- A. Measure the resistance (relative to earth) of each electrical equipment ground brought up from the underground grid.
- B. Do not measure outside ground rod and ground grid resistances to earth during unusually wet weather.

3.3 MOTORS

- A. Inspect all motors for phase identification.
- B. Check proper rotation.

3.4 TRANSFER SWITCH

- A. With all cables disconnected, test the switch insulation with a megger. The minimum acceptable megger reading shall be 100 megohms. Record megger reading and ambient air temperature and humidity.
- B. Manually and automatically operate switch to ascertain that correct and positive operation, interlocking and alarm have been achieved.

- 3.5 PHASE MATCHING AND PHASE ROTATION: Check phase matching and phase rotation immediately prior to energizing of equipment.

3.6 GENERATOR

- A. Perform a megger test on the generator.
 - 1. Perform test with the windings at ambient temperature. Dry and retest any machine not passing this test until it either passes or is found unsatisfactory.
 - 2. Test Procedure
 - a. Apply megger tests between all phases tied together and ground.
 - b. Maintain megger tests for 1 minute or until the reading maintains a constant value for 15 seconds.
 - c. Record all megger readings and ambient temperature at the time of test.
- B. Operational Test
 - 1. Test the equipment to show it will start automatically, pick up and serve full load, shut down and reset.
 - 2. Utilize a resistance / inductance load bank for the test. Load bank load rating shall equal or exceed the kw rating of the generator and shall have sufficient inductance to develop an 80% PF (power factor) load.
 - 3. Initial testing: With a power-line disturbance analyzer monitoring the output of the generator,
 - a. Start the generator and, utilizing the load bank, operate at 25% of rated load (80% PF) for a period not less than 2 hours.
 - b. Increase the load to 50% of rated load (80% PF) and operate for two more hours.
 - c. Increase the load to 100% (80% PF) and hold continuously for a period of not less than two hours.
 - d. Unload the machine and allow it to run under no-load conditions for at least 15 minutes.
 - e. Apply a full 100% step load (80% PF) and hold for a period of not less than 15 nor more than 30 minutes.
 - f. Stop the unit and allow it to cool to ambient temperature.
 - 4. Cold startup test: With a power-line disturbance analyzer monitoring the output of the generator,

- a. Start the generator and, using the load bank, apply a full 100% step load (80% PF) and hold for a period of not less than 15 nor more than 30 minutes.
 - b. Stop the unit, disconnect the load bank and connect the generator to the transfer switch.
 - c. Simulate a power failure and allow the generator to start automatically and pick up the transfer switch load.
 5. To pass these tests, the generator shall maintain the voltage and frequency specified as proven by the power-line disturbance analyzer printout.
 6. If malfunctions occur, take corrective action and repeat the tests until the unit functions as specified.
 7. Fuel utilized for testing shall be replaced at no additional cost to the Owner. After successful completion of testing, fill fuel system to maximum capacity.
 - C. Final acceptance of the generator will be made after the equipment is successfully energized during operational tests.
- 3.7 WIRING DEVICES: Using polarity tester, check polarity of each receptacle.

END OF SECTION 16040

SECTION 16110

METALLIC RACEWAYS

PART 1 - GENERAL

1.1 ELECTRICAL GENERAL PROVISIONS

- A. Provisions of Section 16010 - Electrical General Provisions shall be made an integral part of this section.

1.2 REFERENCES: ANSI PUBLICATIONS

- A. C80.1 Rigid Steel Conduit, Zinc Coated

PART 2 - PRODUCTS

2.1 RIGID STEEL CONDUIT (RSC)

- A. Low carbon, hot-dipped galvanized inside and outside, with threaded ends, minimum size 3/4 inch. Threaded fittings - cast iron or alloy steel, galvanized.

2.2 LIQUID TIGHT FLEXIBLE METAL CONDUIT

- A. Sealtite Type U.A. by Anaconda, Liqueflex Type LA by Electri-flex Company, Type GU by International Metal Hose Company, or Sealflex-U by Universal Metal Hose Company. Fittings shall be Thomas & Betts Series 6000.

2.3 CONDUIT BUSHINGS

- A. Insulated
 - 1. Type B, by O-Z / Gedney
 - 2. Series 1100, by Raco
 - 3. Series BU500, by Steel City
- B. Grounding:
 - 1. O-Z / Gedney Type BLG
 - 2. Raco series 1222 thru 1236
 - 3. Steel City Type BG.

2.4 THREAD LUBRICANT / SEALANT: Shall be Crouse-Hinds Type STL or equal by Ideal or O-Z / Gedney.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Install rigid steel conduit indoors and outdoors above ground.
- B. Install liquid-tight flexible metal conduit for connections to motors and other equipment subject to vibration.

3.2 CONDUIT INSTALLATION:

- A. Cut all conduit with hacksaw or approved cutting machine and ream after threading to remove all burrs.
- B. Arrangement
 - 1. Space groups of conduits uniformly. For bends and offsets, use an approved hickey or bending machine.
 - 2. Install runs of conduit parallel or perpendicular to walls, structural members, or intersections of vertical planes and ceilings.
 - 3. Provide right angle turns consisting of fittings or symmetrical bends.
 - 4. Avoid condensation pockets in installations.
 - 5. Not more than one exposed conduit shall be run down to an exposed wall switch or outlet box.
- C. Join conduit with approved couplings. No running threads will be allowed.
- D. Keep conduit, fittings, and boxes free from foreign matter, before, during, and after installation.

3.3 CONNECTION OF CONDUIT TO SHEET METAL BOXES AND ENCLOSURES:

- A. Fasten conduit securely to ensure electrical continuity of the raceway system.
- B. Install insulated bushings and sealing locknuts or hubs.

3.4 CORROSION PROTECTION: Apply thread lubricant / sealant to joints of all conduit.

END OF SECTION 16110

SECTION 16112

NONMETALLIC RACEWAY

PART 1 - GENERAL

1.1 ELECTRICAL GENERAL PROVISIONS

- A. Provisions of Section 16010 - Electrical General Provisions shall be made an integral part of this section.

1.2 REFERENCES

- A. NEMA TC-2 Electrical Plastic Tubing and Conduit.
- B. NEMA TC-3 PVC Fittings for use with Rigid PVC Conduit and Tubing.
- C. NEC Article 347 - Rigid Nonmetallic Conduit.
- D. UL 651 Rigid Nonmetallic Electrical Conduit.
- E. UL 514 Electrical Outlet Boxes and Fittings.
- F. ASTM D 2564 Solvent Cements for PVC Plastic Pipe and Fittings.

PART 2 - PRODUCTS

- 2.1 SCHEDULE 40 ELECTRICAL PLASTIC CONDUIT: Designed for underground installation without concrete encasement and normal duty application above ground and made of polyvinyl chloride (EPC-40-PVC for Type II and III applications). Minimum size shall be 3/4".
- 2.2 PVC PLASTIC FITTINGS: Designed to be joined in the field by means of a solvent cement system.
- 2.3 SOLVENT CEMENT: ASTM D 2564 or in accordance with raceway manufacturer's printed recommendations.
- 2.4 CLAMPS, STRAPS, WALL HANGERS, AND OTHER HARDWARE: Nylon, PVC or PVC-coated to provide the same corrosion resistance as the raceway.

PART 3 - EXECUTION

- 3.1 APPLICATION: Install EPC-40-PVC when PVC conduit is indicated on the drawings without further definition.
- 3.2 CONDUIT CONNECTION
 - A. Join raceway by means of solvent cement in accordance with the suggested methods indicated in the appendix of NEMA TC-2 for "normal" service conditions.

- B. Install socket type couplings for joining raceway.
- C. Install female adapters with female threads on one end and socket end on the other for adapting nonmetallic raceway to threaded metallic raceway.
- D. Install terminal adapters for adapting nonmetallic raceway to boxes, threaded fitting, and metallic systems. Male threads on one end, socket end on the other. Secure with locknut.

3.3 BENDS

- A. Bends shall be made with factory elbows or with electric heaters designed specifically for the purpose. The use of torches or other flame-type devices will not be permitted. Sections of raceway showing evidence of scorching (brownish color) will be disapproved.
- B. Field bends for 2-inch diameter and larger raceway shall be made using internal support to prevent crimping or deforming during the bending process.

- 3.4 SUPPORT: Support raceways based on the temperatures at the application, but in no case shall the distance between supports be less than the requirements of NEC. Install raceway at least 6 inches away from steam lines and other heat sources.

END OF SECTION 16112

SECTION 16120

WIRE, CABLE, AND WIRING (SINGLE-CONDUCTOR)

PART 1 - GENERAL

1.1 ELECTRICAL GENERAL PROVISIONS

- A. Provisions of Section 16010 - Electrical General Provisions shall be made an integral part of this section.

1.2 REFERENCES: NEMA PUBLICATIONS

- A. WC 5 Thermoplastic-insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
- B. WC 7 Cross-linked-thermosetting-polyethylene-insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

1.3 CONDUCTOR SIZES: Conductor sizes are based on copper.

1.4 WORK: Provide and install wiring required by applicable codes and necessary for a complete and functioning system

PART 2 - PRODUCTS

2.1 CONDUCTOR CODING

- A. Color code insulated grounding conductors in accordance with NEC 210-5(B).
- B. Color code current carrying conductors using the color coding convention existing in the facility:
 - 1. No. 12 thru No. 6 conductors shall have continuous insulation color.
 - 2. Color code conductors larger than No. 6 which do not have continuous insulation color by application of at least two laps of colored tape on each conductor at all points of access including junction boxes.
- C. Each coil of wire shall be delivered to the job in its original package bearing the UL label. Wire shall be marked with size and type every two feet. The neutral and each phase wire shall be furnished with different color insulation in sizes up to and including No. 6 AWG. Sizes No. 4 and larger may be provided in black, if identified by a series of two or more colored bands completely encircling the conductor, located at or near each terminal point, in all junction boxes and at all other points so designated by the inspecting authority. Colored bands shall not be less than 3 inch nor less than two conductor diameters in width, whichever is greater. The same color shall be used for each phase wire throughout the system for all three phase and feeder circuits as applicable for each voltage category.

2.2 CONDUCTOR REQUIREMENTS

- A. All conductors shall be copper.
- B. All wire and conduit sizes shown on the drawings are based on the use of copper conductors with Type THW insulation unless otherwise indicated.

2.3 POWER AND CONTROL CONDUCTORS

- A. Conductors shall be soft annealed copper.
- B. Provide No. 12 conductors, unless otherwise indicated.
- C. Conductors No. 8 AWG and larger shall be stranded.
- D. Conductors No. 10 AWG and smaller may be solid.
- E. Insulation
 - 1. Shall be type THW, THWN, XHHW.
 - 2. Shall be rated for 600 volts, 75 deg C unless otherwise indicated..

2.4 SPLICES

- A. Splices for conductors No. 10 and 12 AWG shall have the following features:
 - 1. Pre-insulated spring connector encased in a steel shell and rated at not less than 105 degrees C.
 - 2. Insulated vinyl cap with a minimum 3/8 inch skirt to cover the bare wires.
 - 3. UL approved for use in enclosures, junction boxes and fixtures.
 - 4. Manufacturer and type:
 - a. 3M Company, "Scotch Lok" Type Y, R and B
 - b. Ideal Industries, Wire Nut
 - c. Approved equal.
- B. No. 8 and larger wires:
 - 1. Compression connectors or splices as manufactured by Burndy, or T&B.
 - 2. Insulate to at least 200 pct. of wire insulation. Use pre-stretched tubing connector insulators, 3M Company, Type PST.

- 2.5 TERMINATIONS: All cable terminations shall be the compression barrel type with spades or studs for final connection to the equipment terminals.
- 2.6 PULLING COMPOUND: Pulling compound shall be Ideal Industries Yellow 77, or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Furnish and install all wire and cable of AWG sizes indicated on the drawings and as specified hereinafter or required for the complete installation.
- B. Install wiring in conduit.
1. Complete and clean out conduit system before pulling wire.
2. Use compound as required to facilitate pulling.
3. Pull conductors using recognized methods and equipment leaving ample lengths of wire at junctions for connections.
- C. Identify all wiring at all points of access including junction and pull boxes.

END OF SECTION 16120

SECTION 16133

PULL AND JUNCTION BOXES

PART 1 - GENERAL

1.1 ELECTRICAL GENERAL PROVISIONS

- A. Provisions of Section 16010 - Electrical General Provisions shall be made an integral part of this section.

1.2 DESCRIPTION

- A. This section specifies boxes installed within buildings and outside above grade.

PART 2 - PRODUCTS

2.1 SHEET METAL BOXES SHALL HAVE THE FOLLOWING FEATURES:

- A. Acceptable Materials
 - 1. Type 5052 aluminum, minimum 0.080 inch thick, or
 - 2. Type 304 stainless steel, minimum 14 gage.
- B. Continuously welded seams.
- C. No knockouts.
- D. Rolled lip around door.
- E. Neoprene gasketed covers.
- F. Stainless steel hardware.
- G. Manufacturer and Type: Hoffman Bulletin A-4 or A-51.

2.2 CAST BOXES SHALL HAVE THE FOLLOWING FEATURES:

- A. Cast iron or copper-free aluminum construction.
- B. Finishes
 - 1. Cast iron: Hot-dip-galvanized or cadmium-zinc electroplated, aluminum cellulose lacquered.
 - 2. Copper-free aluminum: Gray epoxy powder
- C. Hardware: Stainless steel, brass, or bronze.

- D. Manufacturer: Appleton, Crouse-Hinds, or Killark.

2.3 CONDUIT BODIES

- A. Where of sufficient size, conduit bodies may be used in lieu of pull and junction boxes provided they meet the requirements of the NEMA standards referenced above.
- B. Material: Cast copper-free aluminum.
- C. Finish: Gray epoxy powder
- D. Hardware: Stainless steel.
- E. Manufacturer: Appleton, Crouse-Hinds, or Killark.

PART 3 - EXECUTION

- 3.1 Provide pull and junction boxes where shown on the drawings, and where required for changes in direction, at junction points, and to facilitate wire pulling. Provide additional boxes as required so that wire and cable manufacturer's maximum recommended pulling tensions are not exceeded.
- 3.2 Size boxes in accordance with NEC unless larger boxes are indicated.

END OF SECTION 16133

SECTION 16134

WIRING DEVICE BOXES

PART 1 - GENERAL

1.1 ELECTRICAL GENERAL PROVISIONS

- A. Provisions of Section 16010 - Electrical General Provisions shall be made an integral part of this section.

PART 2 - PRODUCTS

2.1 BOXES SHALL HAVE THE FOLLOWING FEATURES:

- A. Cast iron or copper-free aluminum construction.
- B. Finishes:
 - 1. Cast iron: Hot-dip galvanized or cadmium zinc electroplated, aluminum cellulose lacquered.
 - 2. Copper-free aluminum: Gray epoxy powder.

- 2.2 PLATES shall be copper-free aluminum with gray, powder epoxy finish, neoprene-gasketed, weatherproof, Crouse-Hinds WLRD for duplex receptacles, WLGf for ground fault receptacles and WLRS for single receptacles and light switches.

PART 3 - EXECUTION

- 3.1 Support all boxes to maintain alignment and rigidity.
- 3.2 Clean boxes of all foreign matter prior to installation of wiring or devices.

END OF SECTION 16134

SECTION 16140

WIRING DEVICES

PART 1 - GENERAL

1.1 ELECTRICAL GENERAL PROVISIONS

- A. Provisions of Section 16010, Electrical General Provisions, shall be made an integral part of this section.

1.2 REFERENCES

- A. National Electrical Manufacturers Association (NEMA) Publications.
 - 1. WD 1 General Purpose Wiring Devices.
 - 2. WD 3 Alternating-current General Use Snap Switches.
 - 3. WD 5 Specific-purpose Wiring Devices.
- B. Underwriters Laboratories (UL) Publications
 - 1. UL 20 General-use Snap Switches.
 - 2. UL 943 Ground-fault Circuit Interrupters.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Furnish and install wiring devices at all locations shown on the drawings, complete with all mounting devices and other appurtenances where required. All wiring devices shall be the product of a single manufacturer except as specifically stated otherwise. The catalog numbers of the devices herein specified are based on those of Bryant Electric Co. However, equal devices as manufactured by General Electric, Leviton, or Hubbell will be acceptable. If other than Bryant devices are to be used, a list of comparative catalog numbers shall be furnished to the Architect.
- 2.2 AC GENERAL USE SNAP SWITCHES for control of lighting circuits shall be specification grade, full size, heavy duty, composition enclosed, AC type, rated for 20 amperes at 120-277 volts, Nos. 4901-G, 4902-G, 4903-G and 4904-G. Standard, competitive, residential grade and interchangeable line switches will not be acceptable.
- 2.3 RECEPTACLES SHALL HAVE THE FOLLOWING FEATURES:
- A. Ground fault interrupter type.
 - B. UL listed: UL 943 Class A

- C. Configuration: Duplex, NEMA 5-20R
- D. Trip current sensitivity: 5 milliamperes plus or minus 1 milliampere
- E. Trip speed: 0.025 second maximum for a fault of 264 milliamperes
- F. Electronic amplifier protection: 6000 volt transients, ringwave configuration
- G. Withstand rating: 2000 amperes
- H. Operating temperature range: minus 35 to plus 66 degrees C
- I. Front-accessible test and reset push buttons
- J. Color shall match non-ground fault, duplex, convenience receptacles.
- K. Manufacturer and type: Bryant GFR53FT series or equal by Hubbell, Leviton, or Pass & Seymour.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install A.C. general-use snap switches for switching lighting or other branch circuit loads as indicated on the drawings. Where adjacent to doors, coordinate with architectural drawings to ensure switches are installed on strike side of door.
 - 1. Locate centerline at the height of 48" above finished floor.
 - 2. Long dimension of switches shall be vertical unless otherwise indicated or required.
- B. Install receptacles as indicated on the drawings with grounding pole up.
 - 1. Locate centerline at the height of 18" above finished floor.
 - 2. Long dimension of receptacles shall be vertical unless otherwise indicated or required.
- C. It is intended that each such receptacle be equipped with ground fault interrupters. Do not use the feed thru feature to protect downstream receptacles.

END OF SECTION 16140

SECTION 16190

SUPPORTING DEVICES

PART 1 - GENERAL

1.1 ELECTRICAL GENERAL PROVISIONS

- A. Provisions of Section 16010 - Electrical General Provisions shall be made an integral part of this section.
- B. Supporting material shall be complete with hangers, connectors, bolts, clamps, and necessary accessories to make a complete installation.

1.2 LOADING

- A. Spans up to 5 Feet: Deflection shall not exceed $1 / 240$ of span.
- B. Spans 5 Feet and Greater: Deflection shall not exceed $1 / 360$ of span.
- C. Compressive loading shall not exceed 33 percent of manufacturer's published ratings.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Supporting material shall be complete with hangers, connectors, bolts, clamps, and necessary accessories to make a complete installation.
- B. Indoors: Materials shall be galvanized or cadmium plated steel.
- C. Outdoors: Threaded materials shall be stainless steel or fiberglass-reinforced plastic. All other materials shall be aluminum, stainless steel, and / or fiberglass-reinforced plastic.
- D. Support systems shall be composed of standard structural shapes or factory fabricated. Acceptable manufacturers of factory fabricated support systems are:
 - 1. B-Line Systems, Inc.
 - 2. Midland-Ross Corporation, Electrical Products Division (Kindorf)
 - 3. T.J. Cope, Inc . (Aickinstrut)
 - 4. Unistrut

PART 3 - EXECUTION

3.1 SUPPORT

- A. General: Support all equipment which is not inherently self-supporting in such a manner as to effect a rigid and permanent installation.
 - 1. Use factory-fabricated channel, support systems, and as appropriate, other structural shapes such as angles, "C" channels, pipe, and the like.
 - 2. Do not support equipment from roof deck.
- B. Conduit support
 - 1. Runs along walls:
 - a. Single runs: Galvanized conduit straps or ring bolt type hangers with specialty spring clips.
 - b. Single runs: Use clamp and nest back spacers.
 - c. Multiple runs: Channel support with conduit fittings, 25 percent spare capacity.
 - 2. Suspended runs: Trapeze rack with 25 percent spare capacity.
 - 3. Vertical runs: Channel support with conduit fittings, 25 percent spare capacity.

3.2 ANCHOR METHODS

- A. Hollow masonry: Toggle bolts or spider type expansion anchors.
- B. Solid masonry: Lead expansion anchors or preset inserts.
- C. Metal surfaces: Machine screws, bolts, or welded studs.
- D. Concrete surfaces: Self-drilling anchors or powder- driven studs.

END OF SECTION 16190

SECTION 16420

ELECTRIC SERVICE

PART 1 - GENERAL

1.1 ELECTRICAL GENERAL PROVISIONS

- A. Provisions of Section 16010 - Electrical General Provisions shall be made an integral part of this section.

1.2 REFERENCES

- A. National Electrical Manufacturers Association (NEMA) Standards Publications
 - 1. ICS 6 Enclosures for Industrial Control and Systems

1.3 Electric service voltage and configuration shall be as shown on the drawings.

1.4 POWER COMPANY CONTACT INFORMATION:

- A. Name: American Electric Power
- B. Contact person: Ronnie S. Eubank, P.E.
- C. Phone number: 434-522-4281
- D. Email: rseubank@aep.com

1.5 SUBMITTALS

- A. Notify the Power Company of proposed work affecting electrical service requirements prior to beginning construction.

1.6 PROJECT CONDITIONS

- A. Charges by the Power Company for aid-to-construction costs for permanent electrical service will be paid by the Owner.
- B. Charges for temporary electrical service required during construction shall be paid by Contractor.

PART 2 - PRODUCTS

2.1 Metering cabinet shall have the following features:

- A. General: Cabinet construction shall meet the requirements for NEMA 3R enclosures prior to installation of any equipment or machining of opening for raceway.

B. Exterior Sheet Metal

1. 12-gage steel braced and supported to form a rigid structure suitable to support equipment to be mounted therein
2. No holes or knockouts prior to machining of openings
3. Door[s]
4. Three-point latching mechanism
5. Pad-lockable handle
6. Removable center post (two door enclosures only)

C. Interior Subpanels

1. 10-gage steel with rolled edges for rigidity
2. 2" thick A-D grade interior plywood

D. Finishes

1. One coat primer, two coats finish enamel
2. Interior color: Grey
3. Exterior color: Grey

E. Dimensions as required by Power Company

PART 3 - EXECUTION

3.1 Coordinate electric service with the Power Company.

3.2 Metering provisions shall meet requirements of Power Company.

- A. Install meter base(s) furnished by the Power Company.
- B. Install metering cabinet.
- C. Install conduit between the metering cabinet and the meter base(s) as required by Power Company.
- D. Mount Power Company metering transformers supplied by the Power Company.

END OF SECTION 16420

SECTION 16440

SAFETY SWITCHES

PART 1 - GENERAL

1.1 ELECTRICAL GENERAL PROVISIONS

- A. Provisions of Section 16010 - Electrical General Provisions shall be made an integral part of this section.

1.2 REFERENCES: NEMA PUBLICATION

- A. KS 1 Enclosed Switches

1.3 SCOPE

- A. Provisions of this section shall govern switches and fused switches provided as part of panelboards or other equipment.

PART 2 - PRODUCTS

2.1 SAFETY SWITCHES

- A. Switches referred to as disconnect switches or motor circuit switches on the drawings shall be safety switches.
- B. Safety switches shall be the enclosed heavy duty type (Type HD) with quick-make, quick-break mechanism and external padlockable operating handle.
- C. Safety switches shall be rated for 240 or 600 volts as applicable. They shall be horsepower rated when used in motor circuits.
- D. Safety switches shall be:
 - 1. Fusible or non-fusible, as indicated on drawings.
 - 2. Single-phase circuits: two-pole
 - 3. Three-phase circuits: three pole
 - 4. Single throw unless otherwise indicated on the drawings.

2.2 ENCLOSURES

- A. Enclosures shall be NEMA 12 indoors and NEMA 4X outdoors unless otherwise indicated on drawings.

2.3 ACCEPTABLE MANUFACTURERS

- A. Cutler-Hammer / Westinghouse
- B. General Electric
- C. Siemens
- D. Square D

PART 3 - EXECUTION

3.1 APPLICATION

- A. Provide safety switches where indicated on the drawings or required by NEC.

3.2 INSTALLATION

- A. Mount safety switches securely between 3 and 6 foot levels above floor unless otherwise indicated on the drawings.
- B. Furnish fuses for fusible switches of the size indicated on the drawings.

END OF SECTION 16440

SECTION 16450

GROUNDING

PART 1 - GENERAL

1.1 ELECTRICAL GENERAL PROVISIONS

- A. Provisions of Section 16010 - Electrical General Provisions shall be made an integral part of this section.

1.2 SCOPE

- A. Grounding shall be in accordance with NEC as a minimum. Additional grounding requirements shall be as specified or indicated on drawings.

1.3 QUALITY CONTROL

- A. All system connectors shall be listed by Underwriters Laboratories for direct burial in earth or embedment in concrete per ANSI/UL467 Standard for Grounding and Bonding Equipment.
- B. All ground connectors shall meet the requirements of IEEE Std 837 Standard for Qualifying Permanent Connections Used in Substation Grounding.

PART 2 - PRODUCTS

- 2.1 GROUND RODS: Ground rods shall be copper clad steel, 10 feet in length and 3/4 inch in diameter.

2.2 CONDUCTORS

- A. Grounding electrode conductors shall be bare copper sized in accordance with NEC Table 250-66.
- B. Equipment grounding conductors in raceways shall be insulated copper sized in accordance with NEC 250-122.

2.3 CONNECTORS

A. GENERAL

- 1. All ground connectors shall be designed for fault-duty loading and shall have the fault capacity of the maximum sized conductor for which it is designed.
- 2. Pad terminals and in-line splices shall accommodate only one conductor size. All other ground connectors may be range taking.

3. Structural steel and bus bar ground connectors shall accommodate only one rigid member conductor.
 4. All mechanical bonding connectors shall be designed to withstand 150% of the recommended installation torque.
- B. Exothermic type connectors shall be Cadweld, Thermoweld, or approved equal.
- C. Compression connectors shall have the following features:
1. Manufactured from pure, wrought copper in compliance with ASTM B30.
 2. Shall be provided with a corrosion-inhibiting compound pre-applied to the contact surfaces. The compound shall be compatible with the conductors accommodated by the contractor.
 3. Shall be provided with tin plating where required by the application.
 4. Shall be clearly and permanently marked with the following information:
 - a. Manufacturer's inspection symbol
 - b. Catalog number
 - c. Conductor accommodation(s)
 - d. Installation die index or die catalog number (compression)
 - e. Underwriter's Laboratories Listing Mark
 - f. The words "Suitable for Direct Burial", or "Direct Burial", or "Burial" as specified per ANSI/UL467
 5. Shall be Burndy HYGROUND or equal.
 6. Compression dies shall provide embossment of the connector upon successful installation. The embossed index shall match the marking on the installed connector.
 7. Connector marking information shall be legible after installation for inspector cross-reference.
 8. Closed barrel connectors shall have inspection holes at the appropriate location to verify proper cable insertion.
- D. Cable-to-pipe (water or process) connectors shall be as follows.
1. General: Bolts ("u" and straight), nuts, and lock washers shall be stainless steel.
 2. For connections to 2 to 1-1/2 inch (IPS) pipe: O-Z / Gedney Company Type ABG, Burndy Type GAR series, Thomas & Betts Cat No 2-TB or 3-TB, or approved equal.

3. For connections to 2 to 8 inch (IPS) pipe: O-Z / Gedney Company Type CB, Burndy Type GAR series, Thomas & Betts Cat No 3900 series, or approved equal.
4. For connections to pipes larger than 8 inch (IPS): O-Z / Gedney Company Type WG-2 with stainless steel strap and body, Burndy Type GAR series, Thomas & Betts Cat No 3900 series, or approved equal.

PART 3 - EXECUTION

3.1 Grounding electrode conductors and ground counterpoise

- A. Use #4/0 AWG bare copper for connecting ground rods.
- B. Install grounding electrode conductors and ground rod tops a minimum of 30 inches below finished grade.
- C. Connect grounding electrode conductors to pipes using cable-to-pipe connectors. Remove all finishes and oxidation from pipe sufficiently to allow 100 percent contact of connector with pipe.
- D. If earth resistance of the service grounding electrode is more than 25 ohms, notify Engineer.

3.2 Equipment grounding

- A. Install equipment grounding conductors in all raceways containing conductors having 100 volts or more to ground.
- B. Ground all enclosures.

3.3 CONNECTORS:

- A. Use compression or exothermic connectors for all connections that will be direct buried or inaccessible for inspection after construction is complete.
- B. Compression Connectors: Install compression connectors in accordance with the manufacturer's recommendations for conductor preparation (cleaning, pre-crimp), installation tool and die selection, and application of the proper number of crimps.

END OF SECTION 16450

SECTION 16461

DRY TYPE TRANSFORMERS

PART 1 - GENERAL

1.1 ELECTRICAL GENERAL PROVISIONS

- A. Provisions of Section 16010 - Electrical General Provisions shall be made an integral part of this section.

1.2 DESCRIPTION

- A. Transformer ratings and special features shall be as indicated on drawings.

1.3 REFERENCES

- A. NEMA Publications
 - 1. ST 1 Specialty Transformers.
 - 2. ST 20 Dry-type Transformers for General Applications.
 - 3. TR 27 Commercial, Institutional, and Industrial Dry-type Transformers.
- B. UL Standard 506 Specialty Transformers.

PART 2 - PRODUCTS

- 2.1 Transformers shall be continuously rated isolating type for 60 hertz service unless otherwise indicated.
- 2.2 The structure shall be a rigid, self-supporting, completely metal-enclosed structure.
- 2.3 The enclosure shall completely enclose the equipment except for requisite ventilation openings. Such openings shall be covered with diamond-pattern expanded metal which will prevent the insertion 0.375-inch diameter rod into the interior of the enclosure.
- 2.4 The primary shall have two 2.5% full capacity taps above and four 2.5% full capacity taps below rated voltage.
- 2.5 Insulation systems shall be 220 degrees C (150 degrees C rise) for 37.5 KVA and above, single phase, or 30 KVA and above, three phase units.
- 2.6. Insulation systems shall be 185 degrees C (115 degrees C rise) for 0.25 KVA through 25 KVA, single phase, or 3 through 15 KVA, three phase units.

2.7. Audible sound levels shall not exceed the following:

15 - 50 KVA	45 dB
51 - 150 KVA	50 dB
151 - 300 KVA	55 dB
301 - 500 KVA	60 dB

2.8. Acceptable manufacturers for units 1 KVA and greater shall be as follows:

- A. Acme
- B. Cutler-Hammer / Westinghouse
- C. General Electric
- D. Hevi-Duty
- E. Siemens
- F. Square D

2.9 Enclosures for transformers shall be metallic, suitable for indoor or outdoor installation as applicable and rodent proof.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Securely mount transformers at location indicated on drawings.
- B. Install floor-mounted transformers on concrete housekeeping pads.
- C. Mount transformers so that vibrations are not transmitted to the structural parts of building.

3.2 CONNECTION: Make conduit connections with flexible conduit.

3.3 GROUNDING

- A. Ground the transformer case and the electrostatic shield via a full size, grounding electrode conductor.
- B. Bond the transformer neutral to the grounding electrode conductor.

END OF SECTION 16461

SECTION 16470

PANELBOARDS

PART 1 - GENERAL

1.1 ELECTRICAL GENERAL PROVISIONS

- A. Provisions of Section 16010 - Electrical General Provisions shall be made an integral part of this section.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Panelboards shall be of dead front construction utilizing thermal magnetic circuit breakers and shall conform to the requirements established by UL, NEMA and the NEC, except where modified herein. Each shall be suitable for its intended application as scheduled, considering voltage, phase, frequency and intended service. All panelboards shall be UL listed and shall be so labeled.
- B. Panels known as "loadcenters" will not be accepted.
- C. Panelboards shall consist of cabinet or back box, bus assembly, circuit breakers, trim, and all accessories as indicated and required. All characteristics shall be as shown or scheduled on the drawings.

2.2 CABINETS

- A. Cabinets or back boxes shall be fabricated from galvanized or equivalent rust resistant sheet steel of thickness to meet code requirements.
- B. Cabinet depths shall be the manufacturer's standard except where specific requirements indicate otherwise.
- C. Gutter(s)
 - 1. Gutter space shall meet UL and NEC requirements.
 - 2. Where a panelboard is arranged in a riser fed by cable and conduit, provide an auxiliary side gutter of sufficient cross sectional area to accommodate a feeder tap to the panelboard line lugs or the panelboard main breaker, as applicable.

2.3 BUS

- A. The bus assembly shall consist of copper or aluminum bus structure, secured and arranged to receive breakers as indicated.

- B. All bussing shall be designed in accordance with UL standards to suit the loading requirements as scheduled and shall be braced to withstand mechanical stresses created by faults of magnitude equivalent to the rating of breakers to be installed.
- C. Bus assembly shall include main lugs and main breakers where indicated. Arrangement shall also include double row construction of breakers and allowance for breaker replacement from the front without disturbing adjacent units or main bus connections. Bus and mounting pan shall be designed so that circuit breakers may be changed or added without additional machining, drilling or tapping.
- D. Connections to aluminum bus bars shall have special coating, such as plating or inhibiting compound, to prevent electrolysis. Belleville washers shall be used to prevent cold flow.
- E. Phase and neutral bus supports shall be insulated.
- F. Construction shall be such that the bus will not be exposed upon removal of trim.
- G. Provisions shall be included for adjustment of bus assembly and breakers for some vertical alignment and front-to-back position without removal of the assembly.
- H. All panelboards shall be provided with solid neutrals.
- I. Ground bus
 - 1. Grounding bars with lugs shall be provided on all panelboards.
 - 2. Ground busses shall be bonded to panel enclosure.
- J. Space where shown in panel schedules designates space for future protective devices and shall include bus and support components.

2.4 CIRCUIT BREAKERS

- A. Circuit breakers shall as specified in Section 16475 - Molded Case Circuit Breakers.

2.5 PANELBOARD FRONTS

- A. Panelboard fronts shall be of cold rolled steel in accordance with gauges required by code.
- B. Trim shall be fastened to box by means of clamps which indicate their position from the front. Trim clamps shall be concealed to present a flat smooth appearance. The use of screws engaging holes in the box flange for fastening trim will not be acceptable.
- C. Doors
 - 1. Doors shall be fastened to trim by flush concealed hinges.

- 2. Doors shall be equipped with a flush type combination catch and keyed lock. Two milled type keys shall be provided with each panel, and all locks shall be keyed alike.
- 3. Doors shall be equipped with a neat directory frame secured to the inside of the door.
- D. Trim and doors shall be properly cleaned and finished with one rust-inhibiting priming coat and a finish coat of light gray enamel, ANSI Z55.1-1967 No. 61. All circuits shall be identified as specified hereinafter.

2.6 MINIMUM SHORT CIRCUIT RATING

- A. The minimum short circuit rating for the panelboard shall be the rating of the device within the assembly having the lowest short circuit rating.
- B. Maximization of selective tripping coordination is the intent of this design. Use of series rated equipment will not be approved.

2.7 ACCEPTABLE MANUFACTURERS

- A. Cutler-Hammer / Westinghouse
- B. General Electric
- C. Siemens
- D. Square D

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mounting: Bolt to wall such that top of enclosure is 72 inches above finished floor.
- B. Arrange and number circuits exactly as indicated in drawing schedules. If circuit arrangement does not match schedules, Contractor will be back-charged for the cost incurred by the Engineer in editing schedules for As-Built Drawings.
- C. Type entries on directory cards completely and accurately. Equip each circuit breaker with an identification label (as recommended by manufacturer) showing circuit number served. Numbers on identification labels shall match respective circuit numbers on directory cards.

END OF SECTION 16470

SECTION 16475

MOLDED CASE CIRCUIT BREAKERS (MCCB)

PART 1 - GENERAL

1.1 ELECTRICAL GENERAL PROVISIONS

- A. Provisions of Section 16010 - Electrical General Provisions shall be made an integral part of this section.

1.2 REFERENCES

- A. NEMA Publication AB 1 Molded Case Circuit Breakers.

1.3 SCOPE

- A. This section applies to all MCCB whether individually enclosed, group mounted or part of other equipment.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Ratings and special features shall be as scheduled.
- B. Trips shall be thermal magnetic with inverse time delay and instantaneous time-current characteristics.
- C. 225 Ampere frame and larger MCCB shall have interchangeable trips and adjustable magnetic feature.
- D. MCCB shall be industrial grade; except, MCCB may be bolt-on, Quick-Lag "Q-Line" on 120 / 208 and 120 / 240 volt systems.

2.2 MINIMUM SHORT CIRCUIT RATING

- A. The minimum short circuit rating for an MCCB shall be its rating standing alone.
- B. Maximization of selective tripping coordination is the intent of this design. Use of series rated equipment will not be approved.

2.3 ENCLOSURES: Enclosures for individually enclosed MCCB shall be NEMA 12, unless indicated otherwise on drawings.

2.4 ACCEPTABLE MANUFACTURERS

- A. Cutler-Hammer / Westinghouse

B. General Electric

C. Siemens

D. Square D

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install MCCB's as scheduled on the drawings.

B. Individually enclosed MCCB's: Mount enclosure such that its top is 6 feet above the floor.

END OF SECTION 16475

SECTION 16480

MOTOR STARTERS

PART 1 - GENERAL

1.1 ELECTRICAL GENERAL PROVISIONS

- A. Provisions of Section 16010 - Electrical General Provisions shall be made an integral part of this section.

1.2 SCOPE

- A. This section specifies starters shown on the drawings individually mounted; i.e., not an integral part of a piece of mechanical equipment.

1.3 REFERENCES: NEMA PUBLICATIONS

- A. ICS 1 General Standards for Industrial Control and Systems.
- B. ICS 2 Standards for Industrial Control Devices, Controllers, and Assemblies.
- C. ICS 6 Enclosures for Industrial Controls and Systems.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Starters shall be NEMA-rated. IEC-rated equipment will not be accepted.
- B. Starters and associated devices shall have NEMA 4X enclosures.
- C. Starters shall disconnect all un-grounded circuit conductors.
- D. Starters shall have 75°C - rated line and load lugs.

2.2 MANUAL STARTERS

- A. Overload:
 - 1. Thermal overload protection shall be trip-free and the hand reset type. Overload relays shall be Class 10.
 - 2. Each ungrounded phase or motor lead shall have overload protection in its starter.
 - 3. Overload relays in outdoor starters shall be ambient compensated.
 - 4. Elements sized upon nameplate running amperes of the actual motor installed.

- B. Shall have "quick-make" and "quick-break" mechanisms and be trip-free. They shall have provision for padlocking in the "on" and "off" positions.

2.3 MAGNETIC STARTERS

A. General

- 1. Starters shall be electro-mechanical.
- 2. Overload:
 - a. Thermal overload protection shall be trip-free and the hand reset type. Overload relays shall be Class 10.
 - b. Each ungrounded phase or motor lead shall have overload protection in its starter.
 - c. Manual reset in cover
 - d. Elements sized upon nameplate running amperes of the actual motor installed.
- 3. Auxiliary contacts: Two sets, form "C" in addition to those shown on the control wiring diagrams.

PART 3 - EXECUTION

3.1 GENERAL

- A. When motors are supplied with characteristics different from those indicated on the drawings, starters, feeders, overloads, disconnects, and associated devices of the correct size, type, and rating shall be provided.
- B. Provide full-voltage starters unless otherwise indicated.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's printed instructions.
- B. Bolt to wall so that top of enclosure is 60 inches above finished floor.

END OF SECTION 16480

SECTION 16617

SURGE SUPPRESSORS

PART 1 - GENERAL

1.1 ELECTRICAL GENERAL PROVISIONS

- A. Provisions of Section 16010 - Electrical General Provisions shall be made an integral part of this section.

1.2 SUMMARY

- A. These specifications describe the electrical and mechanical requirements for high energy transient voltage surge suppressors (abbreviated as "TVSS" in this specification and referred to on drawings as "surge suppressor").
- B. The specified system shall provide effective high energy surge current diversion, sine wave tracking for electrical line noise filtering and be suitable for application in ANSI / IEEE C62.41 Category B, and C environments, as tested by ANSI / IEEE C62.11, C62.45 and MIL-STD-220A.
- C. The system shall be connected in parallel with the protected system; no series connected elements shall be used which limit load current or kVA capability.

1.3 REFERENCES:

- A. The specified system shall be designed, manufactured, tested and installed in compliance with:
 - 1. American National Standards Institute and
 - 2. Institute of Electrical and Electronic Engineers (ANSI / IEEE C62.11, C62.41, and C62.45)
 - 3. National Electrical Manufacturer Association (NEMA)
 - a. NEMA ICS 6 - Enclosures for Industrial Controls and Systems
 - 4. National Fire Protection Association (NFPA)
 - 5. Underwriters Laboratories (UL)
 - 6. UL 1449 - Standard for Transient Voltage Surge Suppressors (TVSS) (Second Edition)
 - 7. UL 1283 - Standard for EMI / RFI Facility Filters

1.4 LISTINGS

- A. The individual TVSS units shall be UL listed under UL 1449 Standard for Transient Voltage Surge Suppressions (TVSS) and the surge ratings shall be permanently affixed to the TVSS. The unit shall also be complimentary listed to UL 1283 Standard for EMI / RFI Facility Filters.

1.5 SUBMITTALS

- A. Equipment manual with installation, start-up, trouble shooting guide and operating instructions for the specified system.
- B. Electrical and mechanical drawings showing unit dimensions, weights, component and connection locations, mounting provisions, connection details and wiring diagram.
- C. Documentation of specified system's UL 1449 listing and clamping voltage ratings of all protection modes.
- D. Documentation of the specified system's UL 1283 complimentary listing shall be included as required product data submittal information.
- E. Independent fuse coordination tests from a nationally recognized independent testing laboratory.

1.6 WARRANTY

- A. The manufacturer shall provide a full ten-year warranty from date of shipment against any part failure when installed in compliance with manufacturer's written instructions, UL listing requirements, and any applicable national or local electrical codes.
- B. Manufacturer shall make available (local, national) field engineering service support. Where direct factory employed service engineers are not locally available, travel time from the factory or nearest dispatch center shall be stated.

1.7 QUALITY ASSURANCE

- A. The specified system shall be thoroughly factory tested before shipment.
- B. Testing of each system shall include, but shall not be limited to, quality control checks, dielectric voltage withstand tests at twice rated voltage plus 1000 volts per UL requirements, and operational and calibration tests.

PART 2 - PRODUCTS

2.1 TVSS's shall have the features listed below.

2.2 ENVIRONMENTAL

- A. Storage Temperature: Range shall be -40 to +65 C (-40 to +149 F)

- B. Operating Temperature: Range shall be -40 to +50 C (-40 to +122 F)
 - C. Relative Humidity: Operation shall be reliable in an environment with 0% to 95% non-condensing relative humidity.
 - D. Operating Altitude: The system shall be capable of operating up to an altitude of 14,000 feet above sea level.
- 2.3 Audible Noise: The TVSS shall not generate any appreciable audible noise.
- 2.4 Magnetic Fields: The unit shall not generate any appreciable magnetic fields and shall be suitable for use directly inside computer rooms.
- 2.5 Maximum Continuous Operating Voltage (MCOV): Greater than 115% of the nominal system operating voltage to ensure the ability of the system to withstand temporary RMS overvoltage (swell) conditions.
- 2.6 Operating Frequency Range: 47 to 63 hertz.
- 2.7 Overcurrent Protection (Fusing): All protection modes (including Neutral to Ground) of the TVSS shall be internally fused at the component level with the fuses I²T capability to allow the suppressor's maximum rated transient current to pass through the suppressor without fuse operation. If the rated I²T characteristic of the fusing is exceeded, the fusing shall be capable of opening in less than one millisecond and clear both high and low impedance fault conditions. The fusing shall be capable of interrupting up to 300 KA symmetrical fault current with 600 VAC applied. This overcurrent protection circuit shall be monitored and provide indication of suppression failure / operability. Conductor level fuses or circuit breakers internal or external to the TVSS shall not be acceptable.
- 2.8 PROTECTION MODES
- A. Delta Systems: Line-Line and Line-Ground
 - B. Wye Systems: Line-Line, Line-Neutral, Line-Ground
- 2.9 PERFORMANCE RATINGS
- A. Shall be rated to divert the following current levels in each of the listed pathways of protection:
 - 1. 400,000 amperes per phase
 - 2. 200,000 amperes per mode
 - B. Clamping voltages shall be 800 vcc.
- 2.10 Surge Suppression Components: The TVSS / Filter shall be constructed using multiple surge current diversion arrays of metal oxide varistors (MOV), matched to 1% variance, each array rated for at least 40 KA and 10 surges at 25 kA or surge current capacity based on the standard 8 x 20 microsecond waveform. Each array shall be capable of withstanding over 1,250 pulses of

the 10KA IEEE 62.41 Category C surge current without failure when tested per C62.11, C62.45, suggested wait times. The array shall consist of multiple, gap-less, metal oxide varistors, with each MOV individually fused. The arrays shall be designed and constructed in a manner which ensures MOV surge current sharing. No gas tubes, silicon avalanche diodes or selenium plates / rectifiers shall be used. The status of each array shall be continuously monitored and a green LED shall be illuminated if the array is in full working order. All protection modes, including N-G, shall be monitored and internally fused, for compliance to NEC article 110.9, 110.10 and 280.22.

2.11 Connections: The unit shall be designed to be installed using the flexible conduit provided by TVSS manufacturer. All parallel connections to the TVSS shall be kept as short as possible.

2.12 ENCLOSURE

- A. The unit case shall be a plastic enclosure rated UL94-5V, the best rating for resistance to flammability available. Further, the enclosure shall be designed and tested to NEMA 12, 4 and 4X standards.
- B. The enclosure shall be arranged such that no pilot devices protrude beyond the face of the enclosure. If the standard product has such devices protruding beyond the face of the enclosure, install the unit in a larger, clear plastic enclosure.

2.13 STATUS MONITOR

- A. The unit shall have an internal status circuit that monitors the operational status of all modes of protection, including Line to Neutral, Line to Ground and Neutral to Ground. No manual testing shall be required to confirm the integrity of the suppression and filter systems. If the unit does fail, the green LED shall be extinguished and the red LED shall be illuminated.
- B. The unit shall be equipped with a summary alarm relay with one set of Normally Open and Normally Closed (Form C) dry contacts rated for 125 VAC, 1 Amp (minimum). The contacts shall change state and indicate a failure of the unit, a phase loss condition or a full power loss condition.
- C. The unit shall be equipped with a surge counter.

2.14 MANUFACTURER AND TYPE

- A. Citel
- B. EFI / PSP Products
- C. Liebert
- D. Square D
- E. Surge Suppression, Inc
- F. United Power

PART 3 - EXECUTION

- 3.1 Connect the TVSS in parallel to the power source, keeping conductors as short and straight as practically possible.
- 3.2 Twist the TVSS input conductors together to reduce input conductor impedance.

END OF SECTION 16617

SECTION 16620

EMERGENCY STANDBY POWER SYSTEM

PART 1 - GENERAL

1.1 ELECTRICAL GENERAL PROVISIONS

- A. Provisions of Section 16010 - Electrical General Provisions shall be made an integral part of this section.

1.2 DESCRIPTION

- A. A complete emergency standby power system shall be provided including a diesel engine generator set and all auxiliary systems required for automatic operation.

1.3 QUALITY ASSURANCE

- A. Renewal parts and major maintenance shall be readily available through authorized manufacturers' dealers located within 250 miles of this installation.
- B. A single manufacturer's dealer shall supply and warrant all equipment for the emergency standby power system. Warranty period shall be at least 2 years or 1,500 hours of operation, whichever occurs first.
- C. The engine, generator and all major items of auxiliary equipment shall be products of United States of America manufacturers regularly engaged in the production of such equipment, and shall be assembled, tested and shipped to the job site by the engine manufacturer or his authorized distributor maintaining a parts and service facility in the area.
- D. Acceptable manufacturers include:
 - 1. Caterpillar
 - 2. Cummins.
 - 3. Detroit Diesel
 - 4. Generac
 - 5. Onan

1.4 REFERENCES

- A. NEMA Publications:
 - 1. MG 1 Motors and Generators.

2. MG 2 Safety Standard for Construction and Guide for Selection, Installation, and Use of Electric Motors and Generators.
- B. NFPA 30 - Flammable and Combustible Liquids
- C. NFPA 37 - Stationary Combustion Engines and Gas Turbines.
- D. NFPA 110 - Standard for Emergency and Standby Power Systems.
- E. UL-142 - Steel Above Ground Tanks for Flammable and Combustible Liquids

1.5 SUBMITTALS

- A. Submit shop drawings including the following:
 1. Full technical data.
 2. List of installations of comparable size in local area, service and parts facilities complete with manufacturer's published data.
 3. Engine data including:
 - a. Number of cylinders
 - b. Piston displacement
 - c. Break mean effective pressure
 - d. Piston speed
 4. Manufacturer's installation instructions.
 5. Manufacturer's descriptive literature
 6. Blank startup and field test report.
 7. Catalog information for the power-line disturbance analyzer that will be used to monitor the acceptance tests.
 8. Wiring diagram showing interconnection of the following:
 - a. Generator
 - b. Generator remote monitoring panel
 - c. Main fuel tank
 - d. Battery charger

9. Structural drawings of the generator concrete pad (inertia block): Drawings shall be prepared by a professional engineer licensed in the state in which the project is located.
- B. Submit operating instructions, and maintenance and repair data. Furnish manuals in duplicate. Framed operating instructions shall be mounted on or near the unit.
- C. Instruct Owner personnel in performance of routine maintenance and operation.

PART 2 - PRODUCTS

2.1 GENERATOR

- A. Generator voltage and phase ratings shall be as indicated on the drawings.
- B. Frequency shall be 60 Hz
- C. Minimum standby KW ratings shown on the drawings are estimated. Depending upon the engine/generator combination provided, these ratings shall be increased if necessary to carry the indicated loads. Any other changes necessitated by a change in generator capacity shall also be made at no additional cost to the Owner.
- D. Voltage regulation
 1. Motor starting subtransient voltage dip shall not exceed 20 percent. Voltage regulation shall be no more than 4 percent from no load to full load.
 2. Readily accessible voltage drop, voltage level, and voltage gain controls shall be provided. Voltage level adjustment shall be a minimum of plus or minus 5 percent.
- E. Generator insulation shall be Class B, F, or H. Temperature rise shall not exceed 105 degrees C over 40 degrees C ambient for continuous operation at the standby rating.
- F. Frequency regulation from no load to full load shall be in accordance with governor specification. For any addition of load up to 90 percent of rated load the frequency shall recover to steady state frequency band within 5 seconds.

2.2 ENGINE

- A. Engine shall be four cycle diesel
- B. Engine shall have not less than four cylinders.
- C. All engine ratings shall be shown in manufacturer's literature published at least 6 months prior to bid opening, and engine shall be of a design that has been successfully used for at least 3 years.
- D. Generator shall be driven by a single engine without the use of gearing.

- E. Minimum engine compression ratio shall be 16 to 1.
- F. Cylinder liners shall be removable, close grained alloy iron. Main, connecting rod, and cam shaft bearings shall be replaceable.
- G. The crankshaft shall be steel forged, dynamically and statically balanced with hardened journals.
- H. The cylinder block shall be a one-piece ferrous casting containing full length water jackets.
- I. Valve guides and seat inserts shall be replaceable.
- J. Instrument panel shall be engine mounted and contain fuel pressure gage, water temperature gage, and lubricating oil pressure gage.
- K. Engine lubrication shall include a forced feed lubricating oil system with wet sump.
 - 1. Lube oil cooler shall be water cooled.
 - 2. Oil filters shall be replaceable with spring loaded bypass valve to insure oil flow if filter clogs.
- L. Engine combustion air cleaner shall be heavy duty industrial oil bath type air intake cleaner mounted on engine or dry replaceable element type cleaner.
- M. Engine fuel system (diesel fuel):
 - 1. Shall be fuel injection type capable of performance on commercial grade No. 2 fuel oil.
 - 2. Provide primary and secondary fuel filters of replaceable cartridge type.
 - 3. Fuel pump shall be positive displacement, engine mounted type capable of 12 foot minimum suction shall be provided.
 - 4. All fuel lines shall have flexible connections and a check valve shall be provided ahead of the fuel pump.
 - 5. The fuel storage tank shall be a skid-mounted, belly tank sized for a minimum of forty-eight hours operation. Tank shall be double-walled and have a low fuel switch, high fuel switch and a leak detection switch. If leak detection switch requires power, it shall be suitable for operation off of the battery charger alternating current power source.
- N. Engine exhaust system:
 - 1. Shall include a minimum 12 inch long flexible steel exhaust connection for each exhaust outlet to muffler.

2. Muffler shall reduce noise to not more than 85 decibels at 25 feet from the end of the exhaust pipe.
 3. Insulation:
 - a. The muffler and complete exhaust pipe (except flexible portion) shall be insulated to the exhaust manifold.
 - b. Muffler insulation shall prevent temperature of accessible surfaces from exceeding 150 degrees F.
 4. Muffler shall be equipped with a threaded drain hole.
- O. Engine exhaust emissions shall not exceed the limitations of applicable regulations.
- P. Engine governor shall be fully electronic, isochronous type to maintain governed speed at precise isochronous control for 60 hertz operation. The frequency at any constant load shall remain within a steady state band width of plus or minus 0.25 percent of rated frequency.
- Q. Jacket water heater shall be thermostatically controlled, sized to maintain jacket water temperature at 40 degrees F with ambient of -20 degrees F. Heater voltage shall be suitable for circuit voltage shown on drawings.
- R. Radiator shall be engine mounted and cooled by blower fan. Fan belts if used shall be "v" type and have tension adjustment. The radiator shall be capable of cooling the engine at its standby load ratings and 110 degrees F ambient air temperature. The radiator shall be filled with ethylene glycol and water solution to protect to minus 20 degrees F and shall include a cooling system rust inhibitor. All cooling system gaskets shall be suitable for use with ethylene glycol.
- S. Water circulating pump shall be engine driven. Thermostatic water valve shall maintain engine at recommended temperature level.
- T. Generator controls shall be mounted on the generator.
1. The controls shall include the following meters:
 - a. AC voltmeter
 - b. AC ammeter
 - c. Frequency meter
 - d. Running time meter
 - e. Oil pressure gage
 - f. Water temperature gage

2. The controls shall include the following alarms which shall light an individual indicating lamp for each, stop, and lock out the unit. Lockout shall require manual reset.
 - a. Overcrank
 - b. Low oil pressure
 - c. High water temperature
 - d. Overspeed
 - e. Low fuel
3. The controls shall accommodate remote engine control signals from the transfer switch.

2.3 ACCESSORIES

- A. Engine-generator set shall be provided with spring type vibration isolators secured to a common steel channel or H-beam type engine generator base and bolted to the foundation. Vibration isolators shall be sized per the VUSBC for the seismic zone in which the project is located.
- B. Circuit breaker shall be 100%-rated, molded case, solid state trip type having long time, short time, instantaneous and ground fault trips.
- C. Generator remote monitoring panel:
 1. Shall include visual indication of the following:
 - a. Overcrank Alarm.
 - b. Low Water Temperature Alarm.
 - c. High Engine Temperature Alarm.
 - d. Low Lube Oil Pressure Alarm.
 - e. Overspeed Alarm.
 - f. Fuel Tank Rupture Alarm.
 - g. Generator control Switch Not in AUTO Position Alarm.
 - h. Battery charger malfunctioning
 - i. Low Battery Voltage Alarm.
 - j. High Battery Voltage Alarm.

- k. Lamp Test Switch
- l. Alarm retransmission contact (open when no alarm conditions are present) which shall change status upon occurrence of any of the alarms listed above.
- 2. Shall be suitable for operation on 120 vac power source.
- 3. Shall have battery backup for 30 minutes.
- E. Engine starting system shall have the following features:
 - 1. Batteries
 - a. Lead acid type.
 - b. Sufficient capacity to provide three successful starting attempts of 30 seconds each at a cranking speed sufficient to start the engine at a temperature of 0 degrees F. Two minute rest periods will be allowed between successive attempts.
 - c. Single cell type, cells connected using bolted bus links.
 - d. Floor-rack-mounted rack shall be resistant to the corrosive effects of the battery electrolyte.
 - 2. Charger
 - a. Operation: Recharges the battery after engine cranking or interruption of AC power by automatically switching from the normal float voltage to the equalize voltage. Upon reaching the equalize potential, the charger reverts to its nominal float potential until the next power interruption or cranking cycle.
 - b. Ambient temperature compensation and voltage regulation (plus or minus 1.5 percent, equalize and float) to prevent overcharging and associated water loss at high temperatures, and to assure that battery is fully charged at low temperatures.
 - c. Output current limiting: 115 percent of rated.
 - d. Output voltage limiting.
 - e. AC and DC fuses.
 - f. Voltmeter (3.5 inch movement, plus or minus 2 percent accuracy).
 - g. Ammeter (3.5 inch movement, plus or minus 2 percent accuracy).
 - h. Float voltage adjustment (factory-set).

- i. Equalize voltage adjustment (factory-set).
 - j. Battery charger failure alarm contacts, form C contacts rated 1 amp, 120 volts minimum:
 - (1) High battery voltage
 - (2) Low battery voltage
 - (3) Charger failure
 - k. AC input transient overvoltage protection.
 - l. DC output transient overvoltage protection.
 - m. DC output reverse polarity protection.
 - n. Ambient temperature range: 0 to 50 degrees C.
 - o. Float charge indicator.
 - p. Equalize charge indicator.
 - q. NEMA 1 enclosure.
3. DC Cables:
- a. Insulation shall withstand exposure to battery electrolyte.
 - b. Stranded, extra flexible type (building wire not acceptable).
- E. Finish paint coat of engine generator set, accessories, and auxiliary equipment shall be standard factory color.
- 2.4 Generator shall be in an enclosure having the following features:
- A. Weatherproof, rodent-proof
 - B. Constructed of steel, 12 gage minimum with baked enamel finish of standard factory color.
 - C. Hinged lockable doors to provide access to all areas requiring access for operation or routine maintenance.
 - D. Removable panels for areas requiring access for non-routine maintenance.
 - E. Peaked or sloped roof.
 - F. Expanded metal radiator grill.

- G. Fixed air intake louvers.
- H. Sufficient space to house the batteries, charger and muffler.

PART 3 - EXECUTION

- 3.1 Provide emergency standby power system where indicated on drawings.
- 3.2 Provide a nameplate at the service entrance equipment indicating type and location of emergency power source.
- 3.3 Install generator on a steel-reinforced concrete pad (inertia block) having chamfered edges designed as recommended by the generator manufacturer and per the VUSBC for the seismic zone in which the project is located.
- 3.4 Generator remote monitoring panel:
 - A. Install in location indicated on drawings.
 - B. Provide wire and conduit necessary to interface remote monitoring panel to generator on-board controls.
- 3.5 COMMISSIONING shall be in accordance with Section 16040 – Testing and Placing in Service.
- 3.6 Fill fuel system to capacity after completion of commissioning.

END OF SECTION 16620

SECTION 16625

EMERGENCY STANDBY POWER AUTOMATIC TRANSFER SWITCH

PART 1 - GENERAL

1.1 ELECTRICAL GENERAL PROVISIONS

- A. Provisions of Section 16010 - Electrical General Provisions shall be made an integral part of this section.

1.2 REFERENCES

- A. NEMA Publications
 - 1. ICS 1 General Standards for Industrial Control and Systems.
 - 2. ICS 2 Standards for Industrial Control Devices, Controllers, and Assemblies.
 - 3. ICS 6 Enclosures for Industrial Controls and Systems.
 - 4. ICS10 - AC Automatic Transfer Switches
- B. NFPA 110 - Standard for Emergency and Standby Power Systems.
- C. UL 1008 - Standard for Automatic Transfer Switches
- D. NFPA 70 - National Electric Code
- E. IEEE Standard 446 - IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications.
- F. NEC Articles 700, 701, 702
- G. International Standards Organization ISO 9001

1.3 QUALITY ASSURANCE

- A. Transfer switches shall be tested and constructed in accordance with ANSI / UL 1008, Safety Standard for Automatic Transfer Switches, NEC 700 (701) and 702. Transfer switches shall meet impulse withstand voltage test requirements as designated in ANSI / NEMA ICS 1, General Standards for Industrial Control and Systems, and they shall meet voltage surge withstand capability as designated in ANSI / IEEE C37.90, IEEE Standard Relays and Relay Systems Associated with Electric Power Apparatus.

1.4 SUBMITTALS

- A. Certified test data prepared by a nationally recognized testing laboratory to confirm the following switching abilities:

1. Overload and endurance at rated voltage in accordance with tables 21.1 and 23.2 of UL 1008 when the switches are mounted in unventilated enclosures.
2. Temperature rise tests after the overload and endurance tests to confirm the ability of the transfer switches to carry their rated current within allowable temperature limits of insulation in contact with current carrying parts.
3. Symmetrical withstand current values as covered in the individual switch specifications as shown on the drawings.
4. Dielectric test at 1000 volts plus twice rated voltage after withstand current test.
5. Capability of the transfer switches to operate by normal operating means after the withstand current test.
6. Dimensioned exterior outline drawings showing conduit access and door swings.
7. Dimensioned interior drawings showing and identifying all devices.
8. Wiring diagrams

B. Blank startup and field test report.

- 1.5 SCOPE: Furnish and install automatic transfer switches (ATS) with number of poles, amperage, voltage, and withstand current ratings as shown on the plans. Each automatic transfer shall consist of an inherently double throw power transfer switch unit and a microprocessor controller, interconnected to provide complete automatic operation. All transfer switches and control panels shall be the product of the same manufacturer.

PART 2 - PRODUCTS

2.1 TRANSFER SWITCH

A. SWITCH

1. The transfer switch unit shall be electrically operated and mechanically held. The electrical operator shall be a single-solenoid mechanism, momentarily energized. Main operators which include overcurrent disconnect devices will not be accepted. The switch shall be mechanically interlocked to ensure only one of two possible positions, normal or emergency.
2. The switch shall be positively locked and unaffected by momentary outages so that contact pressure is maintained at a constant value and temperature rise at the contacts is minimized for maximum reliability and operating life.
3. All main contacts shall be silver composition. Switches rated 600 amperes and above shall have segmented, blow-on construction for high withstand current capability and be protected by separate arcing contacts.

4. Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. A manual operating handle shall be provided for maintenance purposes. The handle shall permit the operator to manually stop the contacts at any point throughout their entire travel to inspect and service the contacts when required.
5. Design utilizing components of molded-case circuit breakers, contactors, or parts thereof which are not intended for continuous duty, repetitive switching or transfer between two active power sources are not acceptable.

B. MICROPROCESSOR CONTROLLER WITH MEMBRANE INTERFACE PANEL

1. The controller shall direct the operation of the transfer switch. The controller's sensing and logic shall be controlled by a built-in microprocessor for maximum reliability, minimum maintenance, and inherent serial communications capability. The controller shall be connected to the transfer switch by an interconnecting wiring harness. The harness shall include a keyed disconnect plug to enable the controller to be disconnected from the transfer switch for routine maintenance.
2. The controller shall be enclosed with a protective cover and be mounted separate from the transfer switch unit for safety and ease of maintenance. Sensing and control logic shall be provided on printed circuit boards. Interfacing relays shall be industrial grade plug-in type with dust covers.
3. The controller shall meet or exceed the requirements for Electromagnetic Compatibility (EMC) as follows:
 - a. ANSI C37.90A/IEEE 472 Voltage Surge Test
 - b. NEMA ICS - 109.21 Impulse Withstand Test
 - c. IEC801-2 - Electrostatic Discharge (ESD) immunity
 - d. ENV50140 and IEC 801 - 3 Radiated electromagnetic field immunity
 - e. IEC 801 - 4 Electrical fast transient (EFT) immunity
 - f. ENV50142: Surge transient immunity
 - g. ENV50141: Conducted radio-frequency field immunity
 - h. EN55011: Group 1, Class A conducted and radiated emissions
 - i. EN61000 - 4 - 11 Voltage dips and interruptions immunity
4. Controller shall be flush-mounted display with LED indicators for switch position and source availability. It shall also include test and time delay bypass switches.

C. VOLTAGE AND FREQUENCY SENSING

1. The voltage of each phase of the normal source shall be monitored, with pickup adjustable to 95% of nominal and dropout adjustable from 70% to 90% of pickup setting.
2. Single-phase voltage and frequency sensing of the emergency source shall be provided.

D. TIME DELAYS

1. An adjustable time delay shall be provided to override momentary normal source outages and delay all transfer and engine starting signals.
2. An adjustable time delay shall be provided on transfer to emergency, adjustable from 0 to 5 minutes for controlled timing of transfer of loads to emergency.
3. An adjustable time delay shall be provided on retransfer to normal, adjustable to 30 minutes. Time delay shall be automatically bypassed if emergency source fails and normal source is acceptable.
4. A 15-minute cool down time delay shall be provided on shutdown of engine generator.
5. All adjustable time delays shall be field adjustable without the use of tools.

E. ACCESSORIES

1. A set of gold-flashed contacts rated 10 amps, 32 VDC shall be provided for a low-voltage engine start signal. The start signal shall prevent dry cranking of the engine by requiring the generator set to reach proper output, and run for the duration of the cool down setting, regardless of whether the normal source restores before the load is transferred.
2. A push-button type test switch shall be provided to simulate a normal source failure.
3. A push-button type switch to bypass the time delay on transfer to emergency, the engine exerciser period on the retransfer to normal time delay, whichever delay is active at the time the push-button is activated.
4. Auxiliary contacts, rated 10 amps, 250 VAC shall be provided as follows:
 - a. One contact, closed when the ATS is connected to the normal source
 - b. One contact, closed, when the ATS is connected to the emergency source.
 - c. One contact closed when mode control switch is not in AUTO position.

- d. One contact, closed when under voltage or phase voltage imbalance is detected.
6. Indicating lights shall be provided, one to indicate when the ATS is connected to the normal source (green) and one to indicate when the ATS is connected to the emergency source (red). Also provide indicating lights for both normal and emergency source availability.
7. Programmable Engine Exerciser: A seven day electronic time switch for automatic weekly testing of the engine - generator set. The exercises shall be fully programmable and backed up by a permanent battery.

F. WITHSTAND AND CLOSING RATINGS

1. The ATS shall be rated to close on and withstand the available rms symmetrical short circuit current at the ATS terminals with the type of overcurrent protection shown on the plans. WCR ATS ratings to be as follows with specific circuit breakers:

ATS Size	Withstand & Closing Rating MCCB	W/CLF
30-200	22,000A	200,000
225-400	42,000A	200,000
600-1200	65,000A	200,000
1600-2000	85,000A	200,000
2600-3000	100,000A	200,000

2.2 TESTS AND CERTIFICATION

- A. The complete ATS shall be factory tested to ensure proper operation of the individual components and correct overall sequence of operation and to ensure that the operating transfer time, voltage, frequency and time delay settings are in compliance with the specification requirements.
- B. Upon request, the manufacturer shall provide a notarized letter certifying compliance with all of the requirements of this specification, including compliance with the above codes and standards, and withstand and closing ratings. The certification shall identify, by serial number(s), the equipment involved. No exceptions to the specifications, other than those stipulated at the time of the submittal, shall be included in the certification.
- C. The ATS manufacturer shall be certified to ISO 9001 International Quality Standard and the manufacturer shall have third part certification verifying quality assurance in design/development, production, installation and servicing in accordance with ISO 9001.

2.3 SERVICE REPRESENTATION

- A. The ATS manufacturer shall maintain a national service organization of company-employed personnel located throughout the contiguous United States. The service

center's personnel must be factory trained and must be on call 24 hours a day, 365 days a year.

- B. The manufacturer shall maintain records of each switch, by serial number, for a minimum of 20 years.
- C. For ease of maintenance and parts replacement, the switch nameplates shall include drawing numbers, part numbers for main coil, and control.

2.4 ENCLOSURE shall be NEMA 1.

2.5 ACCEPTABLE MANUFACTURERS

- A. Automatic Switch Company
- B. Russelectric, Inc.
- C. Zenith Controls, Inc.
- D. Cummins

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mounting:
 - 1. Enclosures 66 inches high and less: Bolt to wall such that top of enclosure is 72 inches above finished floor.
 - 2. Enclosures greater than 66 inches high: Install on 4-inch high concrete housekeeping pad having chamfered edges. Bolt to wall for stability.
- B. Provide conduit, wiring, and connections required and recommended by unit supplier.

3.2 STARTUP AND TESTING

- A. On completion of the installation, the initial start-up and testing shall be performed by a factory trained representative of the transfer switch manufacturer.
- B. At the time of start-up, operating instructions and maintenance procedures shall be thoroughly explained to the Owner's operating personnel.
- C. Perform operational tests on the complete system in the presence of the Engineer.
- D. In addition to manufacturer's standard field testing, megger switches in both positions prior to energizing either source.

END OF SECTION 16625